HONI SOIT QUI MAL Y PENSE
DIEU ET MON DROIT

AGRICULTURAL RESEARCH INSTITUTE
PUSA

JOHN GILBERT BAKER, F.R.S.

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

VOL. XXXIX.

ILLUSTRATED WITH PLATES AND CUTS

LONDON:
WEST, NEWMAN & CO., 54, HATTON GARDEN.
1901.

LONDON:
WEST, NEWMAN AND CO., PRINTERS,
HATTON GARDEN, E.C.

CONTRIBUTORS

TO THE PRESENT VOLUME.

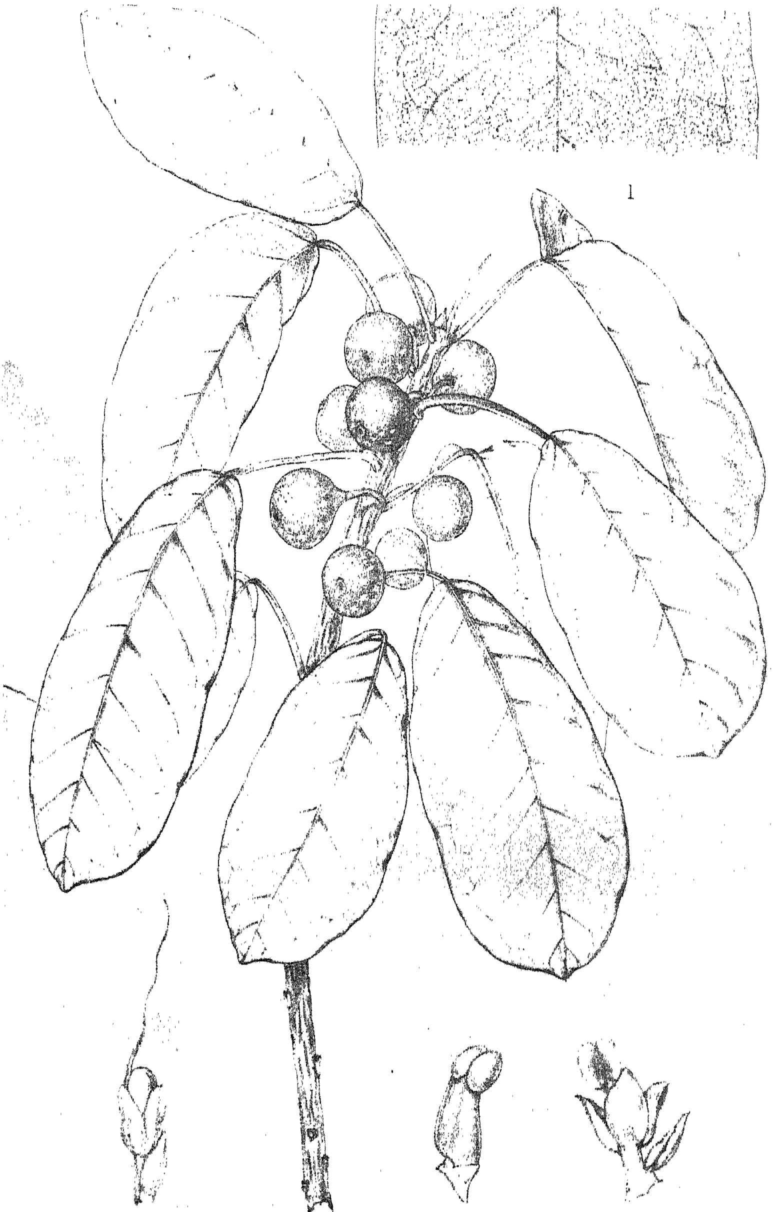
J. E. Bagnall, A.L.S.
E. G. Baker, F.L.S.
J. G. Baker, F.R.S.
Ethel S. Barton.
J. Benbow, F.L.S.
Arthur Bennett, F.L.S.
James Britten, F.L.S.
G. L. Bruce, M.A.
Cedric Bucknall, Mus. Bac.
G. R. Bullock-Webster.
William Carruthers, F.R.S.
W. A. Clarke.
Llewellyn J. Cocks.
H. N. Dixon, M.A., F.L.S.
E. J. Elliott.
David Fry.
Antony Gepp, M.A., F.L.S.
John Gerard, S.J., F.L.S.
W. H. Griffin.
Henry Groves, F.L.S.
James Groves, F.L.S.
W. P. Hamilton.
W. P. Hiern, M.A., F.L.S.
C. P. Hobkirk, F.L.S.
E. M. Holmes, F.L.S.
G. Holmes.
A. O. Hume, F.L.S.
W. Ingham, B.A.
A. B. Jackson.
B. Daydon Jackson, Sec.L.S.
Sir George King, F.R.S., etc.
L. V. Lester, M.A., F.L.S.
H. W. Lett.
Augustin Ley, M.A.
E. F. Linton, M.A.
W. R. Linton, M.A.
Arthur Lister, F.R.S.
Symers M. Macvicar.
E. S. Marshall, M.A., F.L.S.
W. K. Martin.
J. C. Melvill, M.A., F.L.S.
P. Michelmore.
Spencer le M. Moore, F.L.S.
G. R. M. Murray, F.R.S.
R. P. Murray, M.A., F.L.S.
W. E. Nicholson.
John Percival, M.A., F.L.S.
C. B. Plowright, M.A.
A. B. Rendle, D.Sc., F.L.S.
H. J. Riddlesdell.
W. Moyle Rogers, F.L.S.
C. E. Salmon, F.L.S.
E. S. Salmon, F.L.S.
Hans Schinz.
C. D. Sherborn.
Annie L. Smith.
W. G. Smith, F.L.S.
G. Stabler.
H. Stuart Thompson, F.L.S.
Richard F. Towndrow.
W. West, F.L.S.
James W. White, F.L.S.
J. A. Wheldon, F.L.S.
W. Whitwell, F.L.S.
F. N. Williams, F.L.S.
Albert Wilson, F.L.S.
A. H. Wolley-Dod, R.A.
B. B. Woodward, F.G.S.

Directions to Binder.

TAB. 417	to face page	1
,, 418	,,	49
,, 419	,,	81
,, 420	,,	121
,, 421	,,	153
,, 422	,,	193
,, 423	,,	217
,, 424	,,	257
,, 425	,,	289
,, 426	,,	321
PORTRAIT (J. G. BAKER)	,,	title

Or all the Plates may be placed together at the end of the volume.

The Supplement ('Flora of Staffordshire') should be placed separately at the end of the volume.



S. Parkinson del.
R. Morgan anal. et lith.

West, Newman imp.

Ficus Parkinsoni *Hiern.*

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

◆

BANKS AND SOLANDER'S AUSTRALIAN FIGS.

By W. P. Hiern, M.A., F.L.S.

(Plate 417.)

Besides the drawings executed by various artists for the original sketches made by Sydney Parkinson during Cook's First Voyage, which were engraved on copper and are now being issued by the British Museum, there are several which were not engraved. Some of these are merely sketches by Parkinson; of others there are also finished drawings, many of them of equal interest with those engraved. The Museum publication, save in one or two cases of exceptional importance, only reproduces the engraved plates; but among those of which only the drawings exist are some which are well worth publishing, as they represent species which have not been met with since Banks's time, and of which no other figures exist; one such, *Drosera Banksii*, was reproduced last year in this Journal (t. 410B, fig. B.).

Among them are five finished drawings of Figs, made by F. P. Nodder from Parkinson's sketches, to which Mr. Britten directed my attention while I was elaborating the *Moraceæ* of the Welwitsch collection. The specimens collected by Banks and Solander are in the National Herbarium, and as two out of the five apparently have not been described, it may be worth while to publish some account of the series. Of the two in question, I have drawn up descriptions, based upon the specimens and figures, in which I have availed myself of certain details from Solander's MSS.; of the three previously known species I have quoted Solander's description, in accordance with the plan adopted by Mr. Britten in the *Illustrations of the Botany of Cook's Voyage*.

1. **Ficus Parkinsoni** Hiern, sp. n. Arbor mediocris glabra lactescens, ramis obsolete angulatis, ramulis crassiusculis carnosulis longitudinaliter corrugatis levibus ochraceis apicem obtusam versus foliosis, foliis alternis sparsis suboblique ovali-oblongis apice brevissime subacuminatis obtusis vel subacutiusculis basi rotundatis vel obtuse angustatis inconspicue 3–5-nerviis coriaceis integris patentibus petiolatis haud scabridis super nitidis amœne viridibus

venis venulisque parum elevatis subreticulatis subtus pallide viridibus levibus venis venulisque immersis minutissime autem reticulatis planis 9–14 cm. longis 5–7 cm. latis penniveniis, venis lateralibus utrinque ad 8 patulis tenuibus, petiolis supra canaliculatis 4–6 cm. longis, stipulis ovatis caducis dorso adpresse puberulis ad 18 mm. longis, pedunculis axillaribus geminis parum compressis viridibus 6–9 mm. longis, receptaculis globosis glabris albo-maculatis 18–27 mm. diam. juvenilibus pallide viridibus dein albido-viridibus rubro-tinctis maturis atropurpureis obsolete umbilicatis umbilico bracteis apicalibus tribus subrotundis parvis obtusis arcte adpressis clauso monœcis basi bracteatis, bracteis basalibus minimis, floribus brevissime pedicellatis, pedicellis basi bracteolatis, bracteolis flaccidis 1–1½ mm. longis, floribus masculis 1½ mm. longis perianthio inæqualiter tripartito 1 mm. longo segmentis obtusis imbricatis stamine unico filamento brevi firmo antherâ crassâ biloculari, floribus femineis 2 mm. longis perianthio inæqualiter 3–4-fido 1 mm. longo stylo incluso gracili elongato 1½ mm. longo stigmate subulato, cecidiis 2 mm. longis 1¼ mm. latis.

Habitat in insula Booby.

F. nesophilæ Miq. affinis ad sectionem *Urostigma* pertinet.

This plant was collected by Banks, 23rd August, 1770. Booby Island is situate in Torres Strait, 10° 37′ S. lat., 140° 50′ E. long.; it is mostly a barren rock frequented by birds, such as boobies, and it is the great landmark for ships making the strait from the westward. See *Cook's Journal* (ed. Wharton), p. 314 (1893).

2. **F. virginea** Banks & Sol. MSS. Arbor mediocris vel grandis tota novitiis pedunculisque puberulis exceptis glabra lactescens, succo aqueo albo, trunco crasso quasi e pluribus conferruminatis compacto basi angulato, ramis alternis teretibus, ramulis alternis obsolete vel compresse angulatis levibus apicem versus tenuissime pubescentibus, foliis alternis sparsis ellipticis vel subovalibus apice acutiusculis vel obtusis vel nonnunquam breviter acuminatis basi cuneatis vel obtusis subobliquis vix trinerviis coriaceis planis integris patulis utrinque levibus super saturate viridibus vel fuscescentibus nitentibus subtus pallide viridibus vel viridioribus venulis immersis creberrime anastomosantibus minutissime reticulatis subuninerviis penniveniis petiolatis 5–12 cm. longis 15–50 mm. latis, venis plurimis tenuibus immersis, petiolis 8–20 mm. longis super planiusculis vel concaviusculis late canaliculatis infra convexis, stipulis ovato-lanceolatis caducis 8 mm. longis, pendunculis axillaribus geminis teretibus crassis tenuissime pubescentibus brevibus vel obsoletis receptaculo brevioribus, receptaculis subglobosis glaberrimis levibus cernuis vel patulis imperforatis apice puncto nigricante insigniter vel umbilico subaperto maculatis maculis parvis sparsis virescentibus vel immaculatis pisiformibus 6–8 mm. diam. luteis dein obscure rubris tandem rufescentibus mollibus monœcis basi bracteatis, bracteis basalibus brevissimis in cupulam patulamve connatis, bracteolis inter flores parvis flaccidis, floribus parvis ⅝ mm. longis subsessilibus obovoideis, perianthio glabro 3–4-partito segmentis ovatis vel obovatis, stamine unico, filamente brevissimo,

antherâ brevi latâ, stylo brevi, stigmate obtuso vel conico, cecidiis 1 mm. longis, ⅕ mm. latis.

Habitat in insula Booby.

Affinis ut videtur *F. eugenioidis* F. Muell.

The species was also collected by R. Brown, n. 3231, at the banks of the Hunter's and Paterson's rivers below their junction, on Ash Island, &c., in October and November, 1804; he identified his specimens with those of Banks.

3. F. PLATYPODA A. Cunningh. ex Miq. in Hook. Lond. Journ. Bot. vi. p. 561, in syn. (1847); Benth. Fl. Austral. vi. p. 169 (1873). "F. foliis ovato-ellipticis, acutiusculis, integerrimis, glabris; venis obtusangulis, parallelis, fructibus globosis, geminis, pedicellatis. An *Ficus benjamina* Linn. Mant. 129? *Arbor* magna, lutescens, tota glabra. *Truncus* simplex. (*Rami* exserunt *Stolones* funiformes dependentes.) *Ramuli* tantummodo apice foliigeri, testacei, obsolete tetragoni. *Folia* alterna, petiolata, ovata, utrinque attenuata, acutiuscula, integerrima, levia; supra saturate viridia, nitida; subtus pallidiora, venosa minutissimeque reticulata; plana, si quatuor uncias longa, duas lata, sæpe paulo majora. *Venæ* numerosæ, obtusangulæ (ad angulum obtusissimum concurrentes) rectæ, parallelæ, alternæ, obsoletæ, prope marginem concurrentes; margine ipso levi. *Petioli* foliis quadruplo breviores (plerumque uncia paulo longiores) leves, supra canaliculati, subtus rotundati. *Fructus* axillares, gemini, pedunculati, globosi (immaturi magnitudine Pisi maximi), lutei, glabri, punctis nonnullis parum elevatis virentibus adsperssi. *Pedunculi* breves, sesquilineares, crassi, obsolete tetragoni, nudi. Varietas lecta prope Labyrinth Harbour pro omnibus partibus major. *Ramuli* tetragoni, alternatim compressi. *Folia* sæpe sexuncialia. *Petioli* foliis duplo rarius triplo breviores, adeoque longiores quam in varietate e Bustard Bay. *Fructus* globosi, diametro ⅝ unciali, punctis virentibus undique adspersi, plerumque Cynipidibus pleni."—Solander MS.

Bustard Bay is situate about 24° S. lat., 151° 30′ E. long. The species was also collected by R. Brown, n. 3221, on Northumberland Island. He identified his specimens with those of Banks; he also identified them with some specimens which he collected on the banks of Hunter's river below its junction (with Paterson's river) in October, 1804, and which were apparently referred by Bentham, *l. c.* 168, to *F. rubiginosa* Desf.

There is another specimen, collected by Banks, without receptacles, probably belonging to the same species, but with rather larger leaves, which are 10½–13½ mm. long by 3-8½ mm. broad, and approach in character those of *F. macrophylla* Benth. *l. c.* p. 170, non Desf.

Aiton, Hort. Kew. edit. 2, v. p. 486 (1813), cites *F. australis* Willd. Sp. Pl. iv. p. 1138 (1806), as a New South Wales plant introduced in 1789 by Banks. *F. australis* Willd. was intended to be synonymous with *F. rubiginosa* Desf.

4. F. OPPOSITA Miquel in Hook. Lond. Journ. Bot. vii. p. 426 (1848); Benth. *l. c.* p. 176. "*Arbor* parva. Usus: folia pro ligna

poliendo. *Folia* opposita, petiolata, oblonga, acuta, integerrima, scaberrima, venosa venulisque subtus reticulata, basi parum & anguste cordata, quatuor vel quinque uncias longa. *Petioli* foliis sexies breviores; alterni breviores. *Pedunculi* axillares, oppositi, solitarii, uniflori, longitudine petiolorum. *Fructus* globosus, magnitudine Cerasi scaber, rubicundus, apice perforatus apertura rotunda, parum rostrata. Cfr. Folium politorium *Rumph. amb. 4, p. 128, t. 63*, sed folia alterna & basi angustata."—Solander MS.

Hab. prope Labyrinth Bay, Palm Island, and Rocky Point, Endeavour Careening-place.

Labyrinth Bay is on the east coast of Cape York peninsula. The Palm Islands are about 18° 45′ S. lat., 146° 40′ E. long.; and Thirsty Sound (the locality mentioned on the drawing) is 22° 15′ S. lat., 150° E. long.

R. Brown identified his specimens from Keppel Bay, Shoalwater Bay, and Broad Sound, n. 3219, with those of Banks.

This is the plant mentioned under the name of *F. radula* in Banks's *Journal*, p. 316 (ed. J. D. Hooker, 1896), where it is stated that the Australian natives polish their darts with the leaves of this wild fig tree, "which bite upon wood almost as keenly as our European shave-grass [*Equisetum hyemale* L.] used by the joiners"; it is not the *R. Radula* Willd. The native name is given in Solander's MS. as "de pōōr."

5. F. GLOMERATA Roxb. Pl. Corom. ii. col. 13, t. 123 (1798); Benth. *l. c.* p. 178. "*Bracteæ* tres, ad basin fructus, persistentes, ovatæ, acutæ, concavæ, 1½-lineares. Fructus obovato-subrotundus, cum collo angusto longitudine bractearum, glaber, rubicundus (diametro sesquiunciali), odore debili fragarum nec penitus saporis expers, subdulcis, apice notatus *verruca* convexa, quæ tecta est *squamis* circiter decem, ovatis, acutiusculis, concavis, arcte imbricatis, rubicundis, vix 1 lineam longis. Flores Masculi & Feminei in eodem fructu. Mas. *Calyx* bi- (forte interdum tri-) phyllus: *Foliola* oblonga. *Filamenta* duo, filiformia, albida, calyce longiora. *Antheræ* oblongæ, erectæ, majusculæ, albidæ. Flores feminei omnes a Cynipidibus destructi ut illos describere non potui. Ramuli proprii *floriferi*, aphylli, porrecti e caudice & ramis crassioribus, flores in racemum gerentes. *Flores* binati, pedunculati, cicatrice (forte folii decidui) interstite. *Pedunculi* parum compressi, vix ½-unciales. *Folia* sparsa, petiolata, oblonga, acuminata, basi parum cordata, integerrima, glabra, venosa: venæ duæ infimæ oppositæ, paulo a basi cum rachi confluentes, in quadam axilla *glandula* linearis, ferruginea. *Stipulæ* lanceolato-subulatæ, acuminatæ, ⅔-unciales, marcescentes."—Solander MS.

Endeavour river, collected by Banks.

Banks and Solander were delayed about the Endeavour river from 17th June to 3rd August, 1770; it is situate about 15° 30′ S. lat., 142° 10′ E. long.

R. Brown identified his specimens from the Northumberland Islands, n. 3224, with those of Banks.

This is referred to in Banks's *Journal* (p. 299) under the name

F. caudiciflora (by which it is also called in Solander's MSS.) as "a kind of very indifferent fig, growing from the stalk of a tree."

Explanation of Plate 417.—*Ficus Parkinsoni*:—Principal figure, reduced one half. Fig. 1. Frustum of a leaf, under side, natural size. 2. A male flower with adpressed bract and perianth, enlarged ten diameters. 3. The same, with the bract and perianth spread, enlarged about ten diameters. 4. A female flower, enlarged about ten diameters.

ON THE CULTIVATION OF MYCETOZOA FROM SPORES.

By Arthur Lister, F.R.S.

In some notes on Mycetozoa published in this Journal for 1899 (pp. 145–152), I referred to the unusually large clusters of the spores of *Badhamia utricularis* Berk. observed in gatherings in the autumn of 1898 both in Epping Forest and at Lyme Regis. Cultivations from plasmodium found associated with the sporangia produced varying results; in some cultures the spores were in large clusters, in others they were in the usual small groups of seven to ten.

Attempts had been made in former years to complete the whole cycle of development from spore to sporangium in *Badhamia utricularis*, but without success. Although the cultures above referred to proved that the size of the clusters of spores in this species is an inconstant character, it was desirable to have the point confirmed by a cultivation directly from the spores, and having now abundant material at hand another attempt was made.

On January 10th, 1899, spores, in large clusters of from sixteen to twenty-four, were sown in four watch-glasses in filtered rain water, and supplied with thin slices of scalded *Stereum hirsutum* preserved in a moist atmosphere under a bell-jar. On Jan. 12th no spores had germinated; the preparations were allowed to dry, and were rewetted on Jan. 14th. On Jan. 15th a large proportion of the spores had hatched; they were again exposed to the air and allowed to dry and, after rewetting, swarm-cells appeared in great numbers. On Jan. 19th all the swarm-cells had taken the form of microcysts, and in one of the cultures paramæcia had entered, and were rapidly devouring the microcysts. The contents of this watch-glass were therefore cleared away, and a fresh sowing was put down of large-clustered spores from the same source as before. Leaving for the present the history of the preparations in the other three watch-glasses, I will follow that of the fresh culture, which was the only one that yielded satisfactory results. But here it may be interesting to note that the process of drying and rewetting appears to have a distinctly stimulating influence in producing the germination of spores, and in restoring microcysts to the active condition. Without attempting to offer an explanation, it is a matter of experience in numerous cultivations of *Didymium difforme* Duby from spore to sporangium, as well as in the experiments now under consideration, that the treatment has this marked effect.

To return from this digression. The new culture was started on Jan. 26th, the spores being moistened in boiled water, and then spread over slices of scalded *Stereum*. On Jan. 27th no germination had taken place, and the spores were dried and rewetted. As none had hatched on the following day, they were again dried and were left until Jan. 30th, when they were wetted with boiled water, and a few more large-clustered spores were added. The preparation was not again examined until Feb. 10th, when the water was grey with hosts of dancing swarm-cells. On Feb. 20th these had all changed to microcysts: they were allowed to dry until Feb. 22nd, when boiled water was again added. On March 4th swarm-cells were present in great abundance. On March 10th a minute plasmodium was seen under the microscope with $\frac{4}{10}$ obj. On March 12th about twelve small plasmodia were discovered, in which yellow granules could be detected. March 15th, several plasmodia had coalesced, and slow streaming movement was visible. March 16th, plasmodia could be seen with the naked eye, and under the microscope fine streaming through a net-work of veins could be made out. March 17th, the plasmodia had combined into two of unequal size; the larger plasmodium was now in contact with one of the slices of *Stereum*, and as the preparation swarmed with bacteria, producing an offensive smell, it was removed to another watch-glass and supplied with fresh *Stereum*, on to which it soon crawled. The culture was now transferred to a plate covered with a bell-jar and fed with *Stereum* until the plasmodium attained a large size. On April 10th the preparation was divided; one part was exposed to the air to form into sclerotium, of which a good supply was obtained, and the remainder was fed for a week or two longer, when it formed into about 2000 sporangia.* In all those examined the spores were in the normal small clusters of seven to ten.

Of the three other cultures put down on Jan. 10th, one was attacked by paramæcia, which devoured nearly all the swarm-cells, or microcysts; the remaining two, though tended with some care and exhibiting from time to time swarm-cells and microcysts, never produced plasmodia, and were cleared away on April 6th.

The usual and easy method of cultivating *Badhamia utricularis* is from the sclerotium, which can be kept dry and stored for years without losing its vitality. A piece of *Stereum hirsutum* on which the sclerotium has formed is soaked in water for a few hours, when it should be removed and kept wet, but not wholly immersed. In the course of a day or so the plasmodium will have revived, and the piece of *Stereum*, on which it will have begun to creep, should be placed on a dinner plate, near the edge, and covered with a bell-jar. A well-soaked pileus of *Stereum* should now be laid on the awakened plasmodium, which will soon leave the original piece and spread over the new. Every morning a fresh supply of *Stereum* should be placed in front of, and touching, the piece over which the plasmodium is advancing, so that it shall not go back on the exhausted fungus. In this way the growth may be led round the plate, the old pilei are cleared away behind, and fresh added in front until the cultivation has reached the desired dimensions, when it can be dried by exposure to the air to form a fresh store of sclerotium.

---

* The sporangia of *B. utricularis* vary much in dimension; those of the average size contain about a million and a half of spores.

If, however, it is desired that the plasmodium should form into sporangia, the supply of food is stopped. If this is done without taking any further precaution, it is often found that the plasmodium becomes poisoned by returning to the old fungus, now loaded with decomposing refuse-matter, and it produces imperfect sporangia or dies. Though this is not always the case, yet to insure perfect development the following method is found to give good results. A pile of well-washed thick sticks, with the bark on them, is placed under a bell-jar, and the *Stereum*, on which the plasmodium is growing, is laid on the pile; it is as well to add a few pilei at first, that the shock of removal may be recovered from; the plasmodium soon leaves the *Stereum*, and wanders over the sticks; there it frees itself from impurities, and, finding nothing to feed upon, it changes to perfect sporangia in four or five days.

Another cultivation of considerable interest is that from the spores of a possibly new species, which I have named provisionally *Didymium comatum*, from the abundant straight threads of which the capillitium is composed. It was found in March, 1899, growing in company with *Didymium difforme* Duby on old fronds of hart's-tongue fern on the Undercliff at Lyme Regis. It is no doubt nearly allied to *D. difforme*, and may prove to be merely a variety of it. It is most difficult to distinguish between the two forms in the field; in both the egg-shell-like crust may be removed entire from the iridescent membranous inner sporangium-wall, though sometimes the two layers are closely adhering; in *D. comatum*, however, the crystals forming the outer crust are often more stellate and less densely compacted than in *D. difforme*. In the first gatherings there was a marked difference between the spores of *D. comatum* and those of its ally; they were paler and smaller; they contracted into a boat-shape when placed in Hantsch's fluid or spirit, in consequence of one side being thinner than the other, as do also the spores of *D. difforme*; yet they lacked the dark branching lines usually present on the contracting side of the spores of the latter species. Gatherings of *D. comatum* in April, 1900, from the Lyme Undercliff exhibited spores similar to those above described; but another gathering of the species from a straw-yard in an open field at about the same date showed profuse slender capillitium, but had spores that could not be distinguished from the normal spores of *D. difforme*.

The difference between the two forms resolves itself therefore into the structure of the capillitium, and in the behaviour under cultivation to be noticed in the following account: The capillitium of *D. difforme* is scanty, and consists of stout and usually separate scattered threads; these branch upwards in a tree-like manner, and are attached to the upper sporangium-wall by slender tips, and to the lower wall by broad bases. The capillitium of the new form is very profuse, and consists of slender, usually straight threads connected together by a few anastomosing branches, and attached to the sporangium-wall above and below by narrow points. The colour varies in both species, but in *D. difforme* it is generally purple-brown; in *D. comatum* it is almost always colourless, as far as can be ascertained from the comparatively limited material at hand. Beside the Lyme Regis gatherings a small specimen was obtained from near Luton in February, 1893, with profuse colourless capillitium and pale spores, precisely similar to those of the sporangia first collected on the Lyme undercliff.

No specimens have been found with capillitium intermediate in character between these strikingly diverging forms. In order to ascertain by cultivation whether the peculiar features of *D. comatum* would remain constant, the following experiment was made:— On March 9th, 1899, spores were sown in a hanging drop. In about six hours every spore appeared to have germinated, and the preparation teemed with swarm-cells. Three other cultures were put down in watch-glasses on March 10th, and at the same time spores were scattered over a piece of scalded blotting-paper, together with some boiled cress-seeds. As a check experiment, spores of *D. difforme*, gathered with *D. comatum*, were also sown on similarly prepared blotting-paper. I may mention that in cultivations of *D. difforme* from spores sporangia almost invariably begin to appear in about a fortnight; on one occasion, when the spores were sown with seeds of *Plantago lanceolata*, sporangia formed in eight days. In the case of this check experiment well-formed sporangia appeared in about fifteen days from the date of sowing, with characteristic coarse capillitium, which varied in quantity and was reduced in the very small sporangia to one or two threads, or was altogether wanting. This corresponded with former experience, when cultivations of this species have been carried on for many generations in succession. It was not until forty days after the spores of *D. comatum* were sown—that is to say, on April 19th—that the first minute sporangia appeared in the blotting-paper preparation; others continued to develop until April 30th, when thirty-eight sporangia could be counted; but they were so small that they could hardly be seen without the aid of a lens. Every one examined, even the most minute, had profuse slender colourless capillitium and pale spores of precisely the same character as that of the parent sporangia. In the watch-glass experiments no plasmodium formed until May 2nd, or fifty-three days after sowing, and this occurred in only one of the glasses; it increased to more than a millimetre across, and appeared to be quite healthy, when an accident prevented further observation.

As far as it goes, this culture points to a specific difference between *D. difforme* and *D. comatum*, but in the face of the straw-yard gathering before referred to it seems safer to mark the new form as *D. difforme* var. *comatum*.

SOME BRITISH VIOLETS.

By Edmund G. Baker, F.L.S.

The following are notes on some British violets of the Melanium section which have been sent to the Natural History Museum during the last few months.

It may be well to group the plants referable to *V. tricolor* L. (sensu lat.), if we are dealing with British forms alone, under five or six heads; if plants occurring on the Continent were dealt with, these groups would include about double this number.[*]

Viola Pesneaui Lloyd, Fl. Ouest. ed. 3, p. 43 (1876); *V. Curtisii* Forster *β Pesneaui* Rouy & Foucaud, Fl. France, iii. 50 (1896). This plant belongs to the group of which *V. Curtisii* Forst. is the representative species. The group is only a small one, all the members being found near the sea; the diagnostic characters contrasting with the other groups being drawn from the stipule and the flower. The former organ is nearly palmatipartite with straight, linear, narrow and pointed lateral segments. The flowers are not so large as in *V. lutea* Huds., but larger than in *V. arvensis* Murr.

V. Curtisii Forst. was first described in Engl. Bot. Suppl. t. 2693, from Braunton Burrows, where it was gathered by William Curtis,[†] and cultivated in his garden. The roots are fibrous; the stem is angular and rough. The lower leaves oval, or suborbicular, subcordate; the others oval-lanceolate or lanceolate. The bracteoles are placed below the curvature. The petals are generally a little longer than the calyx, "yellowish with blackish branched radiating lines, the lateral paler than the lower, the upper whitish"; but British specimens which have been referred to this species present great variation as to size of flower.

V. Pesneaui Lloyd differs from the above more particularly in the violet colour of the flowers, the upper petals being of a deeper hue. Other alleged differences are that the bracteoles are either placed on the curvature or a very little below, and that the plant is more pubescent, and that the lobes of the stipules are rather larger.

Specimens agreeing with this plant in all its principal characteristics have been received from Mr. D. A. Jones, gathered at

---

[*] The representative species of these groups for British and Western Continental forms would be as follows (see also Rouy & Foucaud, Fl. de France, iii. p. 40):—(1.) *V. hortensis* DC. (pro varietate), Prod. i. p. 303. (2.) *V. saxatilis* Schmidt, Fl. Böh. iii. p. 60. (3.) *V. tricolor* L. Sp. Pl. p. 935. (4.) *V. arvensis* Murray, Prod. Stirp. Gott. p. 73. (5.) *V. Olyssiponensis* Rouy ap. Magn. Scrin. fl. sel. fasc. 6 (1887), p. 114; & in Bol. Soc. Brot. vi. p. 13 (1888). (6.) *V. Kitaibeliana* Roem. & Schultes, Syst. 5, p. 383. (7.) *V. parvula* Tineo, Pug. rar. pl. sic. p. 5. (8.) *V. Curtisii* Forst. in Eng. Bot. t. 2693. (9.) *V. Vivariensis* Jord. Obs fragm. i. p. 19, t. 2. (10.) *V. Rothomagensis* Desf. Cat. p. 153. (12.) *V. lutea* Huds. Fl. Angl. ed. i. p. 331. If Central and Eastern European plants were also included, several species, such as *V. Hymettia* Boiss. & Heldr. and *V. Mercurii* Orphanides, would have to be added.

[†] A specimen from Curtis from Forster's Herbarium is in the National Herbarium.

Mochras, near Harlech, Merionethshire. It may be well to give a description drawn up partly from a specimen sent me by Mr. Lloyd many years ago, and partly from Mr. Lloyd's notes:—

V. Curtisii Forster β Pesneaui Rouy & Foucaud, Flore de France, iii. p. 50 (1896); *V. Rothomagensis* Pesneau, Cat. Loire-Infér. ed. 2, non Desf.; *V. Pesneaui* Lloyd, Fl. Ouest. ed. iii. p. 43 (1876). Root slender. Stems numerous, covered with a fine pubescence. Lower leaves oval, the petiole being generally rather longer than the lamina, the intermediate oval or oval-lanceolate, the upper lanceolate, all crenulate-dentate; described as being longer than the internodes, but in the specimens not always so. Stipules with somewhat arcuate, narrow, ciliate, lateral lobes. Peduncles several times longer than the leaves. Bracteoles described as being situated on or a very little below the curvature; in the specimens examined they are always below the curvature. Sepals oblong-lanceolate, pointed, shorter than the corolla, finally somewhat of a violet colour, with appendages distinctly passed by the straight spur of the corolla. Upper petals violet, lateral also violet a little ascending, lower at first whitish then violet, yellow at the base with seven rays, covering the lower base of the lateral petals. Capsule rounded oval, very obtuse, a little shorter than the sepals.

V. sabulosa Boreau, an allied plant, differs in having longer narrower leaves.

V. Pesneaui Lloyd is in the *Index Kewensis* reduced to *V. Rothomagensis* Desf., the Rouen violet. The former is a plant of the seashore, the latter is synonymous with *V. hispida* Lam.—a very hispid plant, first described from specimens obtained in the neighbourhood of Belbœuf, a short distance from Rouen.

There is a very interesting plant allied to *V. Pesneaui* in the British Museum Herbarium, gathered by Messrs. Britten and Nicholson on the sand-hills at Southport in 1882. The flowers are for the most part violet, and the spur is singularly long and slender. It is apparently at present without a name. Mr. Arthur Bennett informs me he has had the same plant in his herbarium from coast sand-hills, Wallasey, Cheshire, collected by Mr. J. W. Burton. The Mullaghmore form, named by my father *V. Symei*, also belongs to this group, there being numerous puzzling intermediates between the different named forms.

V. carpatica Borbás in Koch's Synopsis, ed. iii. p. 222 (1892). Mr. J. A. Wheldon has recently sent for comparison specimens of a violet gathered on arable land reclaimed from Cockerham peat moss, West Lancashire. The plant bore certain points of resemblance to *V. polychroma* Kerner, but did not entirely agree with this species, and I submitted it to Prof. Borbás, of Budapest, an authority on this group of plants. He identifies it as his *V. carpatica*, a plant which is not uncommon in the Carpathian Alps, and which he states (*op. cit.*) = *V. declinata* × *tricolor* var. *subalpina*.*

---

* It must, however, be remembered that *V. declinata* W. & K. has not been recorded as British.

This plant belongs to the group of plants of which the representative is *V. saxatilis* Schmidt. These are plants generally of montane or submontane regions. The head-quarters of the group may be said to be perhaps the Pyrenees, but *V. lepida* Jordan has been recorded for Britain, and in France has the following distribution, *i.e.* Morbihan, Charente-Inférieure, Ardennes, Meuse; *V. Provostii* Boreau in France reaches Finistère and Morbihan; and *V. contempta* Jordan, Morbihan, Manche, so that representatives of this group should be further searched for in this country. The members of this group are allied, on the one hand, to the group of *V. lutea* Huds., and on the other to that of *V. tricolor* (sensu stricto). With the former they agree in having rather showy flowers with petals always longer than the sepals, and being perennials and subperennials. In the shape of the stipules they agree rather with the latter, those organs being pinnately partite; while in *V. lutea* they are digitately multipartite. The following is a short description of *V. carpatica*, drawn up from specimens kindly sent by Prof. Borbás:—

Root not seen. Stems elongate, internodes about 3 cm. long. Leaves ciliolate. Upper and middle leaves distinctly petiolate, lamina oblong or oblong-lanceolate (differing in this respect from *V. polychroma* Kerner, where the lamina is broader), grossly serrate-crenate, sharply contracting to petiole, about 2–2·5 cm. long., and less than 1 broad. Stipule ciliolate, pinnately divided, middle lobe of stipule entire, narrow oblong, larger than the lateral lobes, which are acute. Peduncles much longer than the leaves; bracteoles sometimes just below the curvature, sometimes 1·5 cm. below. Sepals subacuminate, shorter than spur. Petals longer than sepals, violet-coloured, the lowest and lateral with radiating black lines, yellowish white in the throat, very similar to those of *V. polychroma* Kerner. The longitudinal diameter of flower is rather over 2 cm. Capsule oblong, pointed a little shorter, or nearly as long as sepals.

The plant submitted to Prof. Borbás from Cockerham moss agrees with the above in almost every particular except that the middle lobe of all but the upper stipules is somewhat crenate-serrate and rather longer.

V. NANA Corbière, Fl. Normand. p. 81 (1893). This is one of the most distinct of the forms of *Viola* coming under *V. tricolor*. It is not recognized in the *London Catalogue*, but is the plant named *V. nemausensis* Jord. by Trimen in this Journal for 1871, p. 99. *V. nemausensis* is now by some authors considered synonymous with *V. Kitaibeliana* Roem. & Schultes. This plant would then be *V. Kitaibeliana* Roem. & Schultes var. γ *nana* Rouy & Foucaud, Fl. de France. iii. p. 49 (*V. tricolor* L. var. π *nana* DC. Prod. i. p. 304).*

The distribution of this variety in France is maritime sands in Calvados, Manche, Vendée, Charente-Inférieure, and Gironde. Trimen's specimens in the National Herbarium are from St. Aubyn's

---

* *V. tenella* Poir. Dict. p. 644 was referred to this variety by De Candolle in the *Prodromus*.

Bay, Jersey, and Mr. C. P. Andrews has recently presented to the Herbarium a good series from sand-hills near Rousse Towers, Guernsey. This is probably the plant referred to by Babington (in *Manual*, 8th ed. p. 44) as a small form from Scilly of *V. arvensis* Murr., very like *V. parvula* Tineo.

NOTES ON AFRICAN CONVOLVULACEÆ.

By A. B. Rendle, M.A., D.Sc.

The following notes have accumulated during the working out of several collections which have been recently presented to the Department of Botany from various parts of Tropical Africa. These include the plants of Mr. Scott Elliot's expedition to British East Africa and Mt. Ruwenzori; Dr. Donaldson Smith's plants from Somaliland and the district around Lake Rudolph; Lord Delamere's plants from British East Africa; Dr. Rand's plants from Rhodesia; and small collections made in British East Africa by Mr. S. L. Hinde, and in the Congo Region by Mr. W. H. Migeod.

In the course of this work the material in the National Herbarium has been to a great extent revised and rearranged, and has afforded material for various critical notes, as well as several new species, especially among the South African plants. In connection with the latter, it seemed well to compare the material from the Cape in the Trinity College, Dublin, Herbarium. This I have been able to do at leisure by the unfailing courtesy of Dr. Perceval Wright, who sent over the whole of his South African Convolvulaceæ; and I take this opportunity of recording my gratitude to him.

In the limitation and arrangement of genera I have in the main followed Dr. Hans Hallier, to whom most of the recent work on the Order is due. In several instances I find myself at variance with him on the limitation of species, especially of those adopted in his later papers; I do not think that any useful purpose is served by sinking a large number of readily distinguishable species to make a sort of species-aggregate, which is then broken up into subspecies, varieties, and forms. The relative value of characters is at present largely a matter of individual opinion; and if a plant can be easily distinguished by characters which are generally considered to be of specific importance, it should, except in special cases, be regarded as a specific entity. It is thus more easy to manipulate, and becomes comparable with the average species.

The specimens, except where otherwise stated, will be found in the National Herbarium.

Ipomœa (§ Calycanthemum).

I. gracilisepala sp. nov. Suffrutex caulibus elongatis prostratis ramosis subteretibus breviter hirsutulis; foliis inter minores, hastatis cum basi triangulare et lobis basalibus margine lobulatis, apice obtusiusculis, facie superiore atrato-viride, glabra cum punctulis pellucidis notata, facie inferiore sparse pilosa cum nervo mediano venisque pinnatis valde ascendentibus prominentibus, breviter petiolatis; floribus solitariis vel geminis, pedunculis obsoletis, bracteolis lineari-lanceolatis acutis pilosis, pedicellis quam folia brevioribus, pubescentibus; sepalis e basi lanceolata lineari-acuminatis, æqualibus, dorso marginibusque breviter pilosis; corolla marcida, ut apparet tubuloso-campanulata et calycem haud superante, luteola (?), areis mesopetalis nervis binis conspicuis definitis; staminibus subæqualibus, tubo inclusis, antheris elliptico-sagittatis; stigmate subgloboso; capsula pilosa biloculare, cum valvis 4 dehiscente; seminibus 4, breviter et appresse cinereo-pilosis.

Described from a shoot broken below the apex, 60 cm. long, not exceeding 2 mm. in diameter. Leaves reaching 4 cm. long by barely 1·5 cm. broad at the hastate base. Bracteoles 6–8 mm. long by 1–1·5 mm. broad; flowering pedicels 6–12 mm. long, increasing in the fruit to 1·7 to 2 cm. Sepals 1 cm. long, 2–2·5 mm. broad, increasing in the fruit to 1·5 cm. in length and 3 mm. broad in the lower part, the linear acuminate apex becoming incurved. Corolla apparently about equal to the calyx in length, with a tube 2 mm. in diameter. Filaments 2·5–3 mm. long, anthers a little over 1 mm.; style 3·5 mm. long. Fruit globose, 7–8 mm. in diameter; seeds 4–4·5 mm. long, 1·75–2 mm. broad.

A very distinct species of the section, perhaps nearest to *I. hispida* R. & Sch., which it resembles in habit, but is distinguished by its hastate leaves, with triangular not cordate base, solitary or geminate stalked flowers, and long attenuated sepals.

Hab. South Africa, *Zeyher*, 1846, no. 1224.

I. Hindeana sp. nov. Suffrutex humilis ramo abbreviato (in specimine singulo) sparse hirsutulo; foliis oblongo-hastatis, obtusis, basi subcordata, lobis rotundatis, facie superiore glabra hispidula, atrate viride, facie inferiore in venis venulisque sparse hirsutula, margine breviter hirsutulo, petiolis tenuibus, æquilongis vel quam lamina paullo brevioribus, hirsutulis; pedunculis tenuibus petiolos æquantibus vel excedentibus, glabrescentibus, floribus 2 monochasialibus; bracteolis lanceolatis acutis, pedicello glabro subfiliforme pedunculum subæquante; sepalis lanceolatis acutis, dorso sparse hirsutulis; corolla infundibuliforme calycem 2½-plo excedente, albo (?), areis mesopetalis distinctis, sparsissime pilosulis, cum venis binis luridis conspicue limitatis.

The specimen consists of a slender branch, 1 cm. long, springing from a short stouter woody shoot, 1·5 mm. in diameter, and bearing a few crowded leaves at the apex, in the axil of each of which springs an inflorescence. Leaves to 2 cm. long by 1 cm. broad at the base; basal lobes spreading, barely 3 mm. broad; petioles 1·5–2 cm. long. Peduncle 2–3 cm. long, bracteoles ·5 cm. long, pedicel of opened flower (terminal) equal to the peduncle (2 cm.). Sepals 1 cm. long by 2 mm. broad at the base. Corolla 2·5 cm. long, about 2 cm. broad at the mouth.

A very distinct species, the flowers resembling those of *I. mombassana* Hall. f., but the sepals show no trace of the basal auricles which characterise those of the latter species. The leaf and flower also recall *I. obscura* Chois., but the hirsutulous narrow pointed sepals at once distinguish it.

Hab. British East Africa. Machakos, *S. L. Hinde*, 1896.

I. CRASSIPES Hook. In Bull. Herb. Boiss. vii. 44–48, Dr. Hallier has elaborated this species, extending it to include a number of species previously described by himself and others. These are arranged under ten varieties, and one variety is further divided into subvarieties. I have not seen all the specimens cited in the above arrangement, but, after carefully working through the accessible material, I find myself somewhat at variance with the conclusions. For instance, if *I. hewittioides* Hall. f. becomes *I. crassipes* var. *hewittioides*, why is not *I. fulvicaulis* (*Aniseia fulvicaulis* Hochst.), to which *I. hewittioides* shows far more resemblance than to typical *I. crassipes*, also included as a variety? The same question arises with other species, e.g. *I. asperifolia* Hall. f.; in fact, once start making these species-aggregates, and it is not easy to stop. Dr. Hallier, having gone so far, should certainly have gone farther. I have tried to arrange the forms in question in accordance with the more generally accepted views on the limitation of species, with the following results:—

I. crassipes Hook. (*I. calystegioides* E. Meyer) comprises the South African forms included by Hallier under var. *genuina*, var. *longepedunculata*, var. *ovata*, and probably var. *thunbergioides*, from the description. These hang together fairly well, varying in the greater or less hairiness, breadth of leaf, length of peduncle, and moderate to large lanceolate to ovate bracteoles. Var. *ukambensis* Hall. f., which is *I. ukambensis* Vatke, in *Linnaea*, xliii. 510, from East Tropical Africa, must, I think, be regarded as a distinct species closely allied to *I. crassipes*, but differing in the markedly rounded apex of its oblong leaves. Var. *hewittioides* Hall. f. (*I. hewittioides* Hall f.), in Engl. Jahrb. xviii. 127 (Dec. 1893), *I. andongense* Rendle and Britten in Journ. Bot. 1894, 171, an Angolan plant, is, as I have already indicated, very distinct, and more nearly allied to *I. fulvicaulis*, both in form of leaf and in the dense several-flowered inflorescence.

Hallier also suggests that another Angolan species (*I. adumbrata* Rendle and Britten in Journ. Bot. 1894, 173) may be synonymous with his var. *ononoides* from the Transvaal. I have seen no authenticated specimens of the variety, but should prefer to retain *I. adumbrata* as a distinct species of the affinity of *I. crassipes*, but separated by the shorter, proportionately broader, very obtuse leaves, and small slender almost linear bracteoles.

I. Greenstockii Rendle in Journ. Bot. 1896, 35, is also indicated as a synonym of the species (p. 44); in fact, if we exclude the two Nyassaland specimens which are on p. 46 tentatively referred to var. *ukambensis*, it remains as the sole typical representative. It is, however, a distinct form with dwarfed growth, short crowded ascending to suberect branches, and long narrow suberect leaves; and, whether or no specifically distinct, is certainly far from typical.

On this view of the species there are left two plants not yet accounted for, which, though doubtless inseparable from Dr. Hallier's aggregate, must, I think, in the more usual acceptance of the term, be regarded as distinct species; their descriptions follow.

I. sarmentacea, sp. nov. Suffrutex caulibus tenuibus lignosis e basi crassa lignosa brunnea eforme prostratis, flexuosis, teretibus, tortulis, ut sunt petioli, nervi in foliorum dorso prominentes, pedunculi, bracteolæ, et sepala tenuiter hispidulis; foliis oblongo-ovatis, obtusis, basi breviter subcordatis vel retusis, facie superiore saturate viride, parciter appresse pilosa, facie inferiore venulosa, petiolis brevibus; pedunculis unifloris quam folia $\frac{1}{3}$–$\frac{1}{5}$-brevioribus, bracteolis parvis, anguste lanceolatis acuminatis, a calyce paullo remotis; sepalis binis exterioribus ovatis basi vix ampliatis acutis, interioribus angustioribus; corolla tubuloso-infundibulare, calycem duplo excedente, ut apparet purpurea.

Shoots 20–40 cm. long, a little over 1 mm. in maximum breadth. Leaves 2·5–5·5 cm. long by 1·8–2 cm. broad, the under surface a much lighter green than the upper, and chased with the darker and decreasingly prominent midrib, ascending lateral veins, and often ladder-like cross unions. Petioles 5–7 mm. long. Peduncles (including pedicel) of open flowers 1·2–1·5 cm. long, bracteoles 7–8 mm. long by 1·5–1·75 mm. broad. Outer sepals 12 to barely 15 mm. long by 5–6 mm. broad, the two innermost (1·5 cm. long) linear, tapering from a base scarcely exceeding 2 mm. broad, the intermediate lanceolate, 3·5 mm. long. Corolla nearly 3·5 cm. long, tube a little over 2 cm. long, and 5–6 mm. in diameter about the middle, spread of mouth of corolla 2·8 cm.

The vegetative characters closely resemble, from the description (*l. c.* p. 49), those of Hallier's *I. crassipes* var. *grandifolia*, but the peduncles are shorter (2–7 cm. in the variety), the small bracteoles narrow-lanceolate, not linear, and the sepals only about half as broad, those of var. *grandifolia* being described as "1 cm. lata"; the corolla is also larger. The new species has the broad ovate outer sepals of *I. crassipes*, but in the form of leaf approaches *I. fulvicaulis*; the latter, however, differs in the density and colour of its tomentum, several-flowered heads, &c.

Hab. Transvaal; Pilgrim's Rest, *Rev. W. Greenstock*, 1879.

I. bellecomans, sp. nov. Suffrutex cinereo-pilosa, caulibus robustis sublaxiter foliatis, ramosis, siccis sæpe compressis, haud solidis, ramis sæpe strictis, patentibus; foliis parvis, breviter petiolatis ovatis obtusis basi interdum truncatis, utrinque densissime cinereo-pilosis; pedunculis unifloris, folia excedentibus; bracteolis a calyce remotis, ovatis; sepalis externis magnis ovatis ad folia similibus sed acutis, internis admodum angustioribus e basi lanceolata acuminatis; corolla (marcida) ut apparet roseo-purpurea infundibuliforme et calycem plus duplo excedente, in areis mesopetalis pilosula.

The longest shoot (broken at the base) in the specimens measures 55 cm. in length, and 3 mm. in breadth; the shoots, like the branches, are somewhat densely covered with soft rather short whitish hairs, the covering becoming denser, almost as on the leaves, in the young tops. Leaves generally about 1·5 cm. long by 6–7 mm. broad, rarely somewhat exceeding this; on the shorter branches often much smaller, becoming oblong-ovate or lanceolate in shape. Peduncles 1·5–3 cm. long, bracteoles 8–10 mm. long by 2·5–3 mm. broad, pedicels generally 1 cm. long. Outer sepals 1·5 cm. long by ·5 cm. broad just above the base, the innermost 3 mm. broad. Corolla apparently about 3 cm. long.

Near *I. crassipes*, but distinguished by habit, the dense ash-coloured covering of hairs, the short bluntly ovate leaves, and the ovate outer sepals with a rounded and not enlarged base. Apparently near *I. crassipes* var. *strigosa* Hall. f., which I have not seen.

Hab. South Africa, *Zeyher*, 1846, no. 1213. Transvaal, Apies river, *Burke*, no. 347.

The following plants, not previously cited, are included in those South African forms which I regard as representing *I. crassipes*:—

Var. GENUINA Hall. f. in Bull. Herb. Boiss. vii. 46.

South Africa, *Zeyher*, 1846, nos. 1210, 1212. Natal, Macalisberg, *Burke*, no. 353, "flowering in October"; and no. 177 (in herb. Trin. Coll. Dublin).

Var. LONGEPEDUNCULATA Hall. f. *l. c.* 45.

Zululand, *W. T. Gerrard*, no. 1330.

Var. OVATA Hall. f. *l. c.* 47.

Natal, near Newcastle, alt. 4000 ft., *J. M. Wood*, no. 6242, "flowers rose-purple," Jan. 1897; and, without precise locality, *J. Sanderson*, 1860, no. 276 (in herb. Trin. Coll. Dublin).

In the *Catalogue of Welwitsch's African Plants*, i. 732, two numbers are assigned to *I. crassipes* Hook. No. 6128 is *I. adumbrata* Rendle & Britten, and in my opinion is a distinct species. No. 6130 is a small dwarfed specimen bearing only young flower-buds, and may represent a new species allied to *I. crassipes* on the one hand, and *I. blepharophylla* on the other. It differs from the former in the subequal ovate sepals, the innermost only being conspicuously smaller, and the oblong leaves with rounded apex and base recalling those of typical *I. blepharophylla*, which is, however, distinguished by its narrowly ovate sepals.

I. OBLONGATA E. Meyer var. HIRSUTA, var. nov. Foliis ovato-oblongis utrinque marginibusque dense et subferrugine hirsutis; bracteolis sepalisque dorso hirsutis.

Leaves generally between 3 and 4·5 cm. long by 1·2–1·5 cm. broad, covered with a somewhat dense covering of rather long appressed stiffish hairs with a tuberculate base. Similar but often paler hairs occur on the bracteoles and sepals.

Hab. South Africa, *Zeyher*, 1846, no. 1208. Natal, Macalisberg, *Burke*, no. 179 (in herb. Trin. Coll. Dublin).

I. Lambtoniana, sp. nov. Suffrutex caulibus elongatis prostratis sparse hispidulis denique glabris; foliis cordato-ovatis, breviter petiolatis, apice abrupte acutiusculis, sparsissime pilosis, venulosis præsertim in pagina inferiore; pedunculis folia haud æquantibus, unifloris, basi articulatis, bracteolis anguste lineari-lanceolatis a calyce paullo remotis velut pedunculis hispidulis; sepalis ovato-lanceolatis, acutis, dorso plus minus hispidulis; tribus interioribus, duos externos paullo excedentibus; corolla infundibuliforme, purpurea, calycem plus duplo excedente, areis mesopetalis valde limitatis, 3–5-nerviis.

Described from a shoot cut off at the base, and 80 cm. long and 2 mm. greatest diameter. Leaves reaching 5 cm. long by 3·7 cm. broad, becoming smaller as we ascend the shoot; petioles to 1 cm. long; midrib and pinnæ subprominent on the under leaf-surface, pinnæ 5–6 on each side, spreading-ascendent, the two lower arising just above the leaf-base; the reticulate connecting veins conspicuous on both surfaces in the dried leaf, but especially on the under. Peduncles ·5–3 cm. long, jointed at the base; bracteoles 5–6 mm. long, less than 1 mm. broad, 2–4 mm. below the calyx. Sepals 12–14 mm. long by about 4 mm. broad. Corolla 3–5 cm. long, tube 7 mm. in diameter (when dried and pressed), spreading to about 3·5 cm. at the mouth.

Near *I. oblongata* E. Meyer, but distinguished by its cordate-ovate leaves and jointed peduncles.

Hab. Natal, near Ladysmith, April, 1861, *W. T. Gerrard*, no. 622; "a trailer with purple flowers." Specimen in herb. Trin. Coll. Dublin.

I. sublucens, sp. nov. Suffrutex ramosus, caulibus ramisque ut tota planta sublucenter et albide sericeo-pubescentibus, lignosis, flexuosis, siccis angulatis compressis, non solidis; foliis oblongo vel elliptico-ovatis, apice rotundatis, basi subcordatis, petiolos triplo excedentibus, in facie superiore sparsius, in facie inferiore marginibusque densius, et in foliis junioribus lucenter, albide sericeo-pubescentibus; pedunculis unifloris, quam folia duplo brevioribus; bracteolis ad calycem subapproximatis, lineari-spatulatis; sepalis anguste ovatis, exterioribus latioribus acutis, interioribus acuminatis; corolla purpurea quam calyx triplo longiore, ut apparet infundibuliforme, areis mesopetalis bene definitis, dorso albide-pilosis.

The specimen consists of a branched shoot nearly 70 cm. long, which, especially in the younger parts, bears a short white somewhat shining pubescence; the angular internodes reach 2 mm. in diameter. Leaves 4·5–6·5 cm. long, 2–3·5 cm. or rarely 4 cm. broad; petioles 2 cm. or less; midrib broad, prominent on the back of the blade, lateral veins pinnate, subprominent, ascending, crowded at the base of the leaf; the back and margin in the young still plicate leaves bears a dense shining silky pubescence, which on the back becomes less bright and dense in the older leaves. Peduncles 2·5–3 cm. long; bracteoles about 1·5 cm. long, barely reaching 3 mm. in breadth below the apex. Sepals 1·5–1·7 cm. long, 4 mm. or less in breadth, the inner narrower and slightly larger than the outer. Corolla much withered and eaten, 4·5 cm. long.

A very distinct species, perhaps nearest *I. oblongata* E. Mey., but differing in its silky whitish covering, larger leaves, longer bracteoles, &c.

Hab. Port Natal; *Miss Owen*, in herb. Trin. Coll. Dublin.

I. Randii, sp. nov. Suffrutex ferrugine hirsutulus, caulibus validis prostratis, subtriangularibus; foliis ovatis apice rotundatis, basi truncatis, petiolatis, lamina petiolum quadruplo excedente, venis conspicuis; floribus inter majores, solitariis, pedicellatis, pedicellis quam folia triplo brevioribus; bracteolis sub calyce, anguste lineari-lanceolatis; sepalis acuminatis, exterioribus ovatis, interioribus lanceolatis, dorso denso ferrugine hirsutulis; corolla pupurea, calycem plus duplo excedente, fasciis mesopetalis cum nervo distincto utrinque limitatis, dorso superne hirsutulis; fructu . . . .

The strong horizontal shoots are about 3 mm. broad, and bear, like the leaf-stalks and pedicels, numerous short stiffish reddish brown hairs, internodes 2–4 cm. long. Petioles 1·5–2 cm. long; blades 7–8 cm. long by 4–4·5 cm. broad just above the base, bearing numerous short appressed pale brownish or ferruginous stiffish hairs on each side, and a dense marginal covering. Peduncles 2–4 cm. long, bracteoles about 1·5 cm. long, 2–2·5 mm. broad, and, like the sepals, densely hirsutulous on the back; sepals about 2 cm. long, scarcely 5–7 mm. broad, diminishing in breadth from the outer to the inner; corolla (withered) scarcely 5·5 cm. long, presumably infundibuliform.

Near *I. elongata* E. Meyer, but distinguished by the much larger leaves, the ferruginous hair-covering, and the larger densely hairy sepals.

Hab. Rhodesia; Bulawayo, *Dr. Rand*, no. 271, December, 1897.

I. Robertsiana, sp. nov. Suffrutex hirsutulus caulibus prostratis; foliis parvis, lineari-lanceolatis, breviter petiolatis; floribus solitariis, pedunculis folia æquantibus, majoribus, bracteolis 2, anguste linearibus, ad calycem approximatis; sepalis lanceolatis ad ovatis, acuminatis, hirsutulis, interioribus latioribus; corolla purpurea, late infundibuliforme glabra, fasciis mesopetalis cum nervis 3 distinctis lineatis; staminibus valde inclusis; stigmate subgloboso; fructu . . . .

The long spreading shoots have a somewhat sparse covering of short stiffish white hairs, which are present also on the leaf-stalks, the margin and backs of the leaves, the flower-stalks, bracteoles, and the backs of the sepals; the upper leaf-surfaces are glabrous, and the leaves are often folded on the midrib. Leaves on well-developed shoots about 3 cm. long by ·5 cm. broad, with a petiole of 2–3 mm. Flower-peduncles 2–3·5 cm. long, bracteoles 1 cm. or a little less; sepals scarcely 1·5 cm. long by 3·5–5 mm. broad; expanded corolla 5 cm. long by nearly as broad.

Near *I. elongata* E. Meyer, but distinguished at once by its linear-lanceolate shortly stalked leaves, and longer flower-stalks. Recalls *I. argyreioides* Chois. (*I. cana* E. Mey.) in habit and leaf-form, but the smaller leaves and general hairiness of the whole plant distinguish it.

Hab. Transvaal; Pilgrim's Rest, *Rev. W. Greenstock*, 1879.

I. Scotellii Rendle, sp. nov. Suffrutex humilis hirsutulus caulibus tenuibus brevibus, e basi lignosa flexuose diffusis; foliis truncato-cordatis, apice rotundatis interdum subemarginatis, petiolos flexuosos excedentibus; dichasiis axillaribus, sessilibus, bracteolis anguste lineari-lanceolatis; floribus inter mediocres, breviter pedicellatis; sepalis dorso dense hirsutulis, externis ellipticis subacutis, internis lineari-angustatis acutis; corolla purpurea tubuloso-infundibuliforme, fasciis mesopetalis dorso hirsutulis, conspicue trinerviis; stigmate subgloboso; fructu . . . .

A small low-growing plant with a stout woody caudex, from which spring a number of slender, very flexuose shoots, 5–9 cm. long, and 1·5–2 mm. thick, which, like the petioles, are densely covered with short stiffish flexuosely-spreading yellowish-brown hairs. Leaf-stalks 1·5–2·2 cm. long by about 1 mm. broad, leaves 2·5–3·5 cm. long, and generally as broad, densely covered on both surfaces, especially on the veins, with short stiffish appressed hairs springing from a small indurated base. Flower-buds bluntly conical. Pedicels 4 mm. long or less, bracteoles ·5 cm. long, hairy on the back like the leaves and the sepals, sepals 1 cm. long, the outer 4 mm., the inner less than 1 mm. broad. Corolla (withered) 2·2 cm. long, tube barely 2 mm. broad above the base.

Near *I. asperifolia* Hall. f., but distinguished by having leaves about as broad as long, and by the elliptical not ovate outer sepals.

Hab. Shire, Urundi, 4–5000 ft., *G. F. Scott Elliot*, 1893–4, no. 8373.

I. Cardiosepala Hochst. ex Choisy in DC. Prodr. ix. 429. (*Ipomœa calycina* Clarke in Fl. Brit. Ind. iv. 201, non Meissn. in Mart. Fl. Bras. vii. 260.)

Rhodesia; Bulawayo, *Dr. Rand*, no. 366, May, 1898.

Section Dasychætia.

I. Ovata E. Meyer, nomen, in Drège, Zwei pflanzengeogr. Document. pp. 154, 195.

Suffrutex fulve hirsutus, caulibus ramisque valde diffusis, robustis angulatis compressis non solidis; foliis ovatis ad oblongo-ovatis rarius oblongis, obtusis mucronulatis, utrinque hirsutulis, petiolos sæpe triplo excedentibus; pedunculis folia subæquantibus vel paullo brevioribus, 1-pluri-floris; floribus magnis brevissime pedicellatis, bracteolis lineari-subulatis, sicut sepalis subsimilibus sed e basi latiore acuminatis, dorso hirsutulis; corolla carnea infundibuliforme calycem plus duplo superante, areis mesopetalis valde limitatis plurinerviis sparse pilosis.

The strong hollow spreading shoots are conspicuously flattened and angled when dried, 3–4 mm. in breadth, and bear numerous stiffish yellowish hairs, a similar covering being found on the leaves and inflorescence as far as the exposed backs of the sepals. Leaves 5·5–10 cm. long by generally between 2·5–4·5 cm. broad above the base, rarely narrower or broader; petioles generally between 1·5–4·5 cm. long. Peduncles 4·5–11 cm. long, bracteoles and sepals 1·5–2 cm. long, the former 1·5–2 mm., the latter to 3 mm. broad in the lower part pedicels 4 mm. or less. Corolla crimson, 5 to nearly 7 cm. long, 4 cm. broad at the mouth.

Very near *I. pellita* Hall. f. in Engl. Jahrb. xviii. 130 (1893), but the latter is distinguished by its cordate leaves, and the very dense lucent hair-covering of leaves and stem.

I have written out this species as I cannot find that any description has ever been published or reference made to it in any published account of the genus. It belongs to the section *Dasychætia* of Hallier's arrangement of his African species in Engler's *Jahrbuch*, xviii. 130. This section contains two species, the closely allied *I. pellita* and also *I. linosepala* Hall. f., collected by Welwitsch in Angola. Hallier refers to a third species, from Natal (*Gerrard*, no. 577), represented by incomplete specimens in the Vienna Herbarium, and having large ovate long-stalked leaves, remarkably long flower-stalks exceeding the leaves, and long linear bracts. I have little doubt that this is *I. ovata* E. Meyer, as in the Herbarium of Trinity College, Dublin, there is a specimen from the Nototi River, Natal, collected by W. T. Gerrard, consisting of a leaf and a fruit-bearing peduncle, both detached and broken at the base, which evidently belong to this species, and were so determined many years ago by Mr. J. G. Baker.

My description is based on specimens of Drège labelled "*Ipomœa ovata* E. Mey.," and others which agree with it, and, like it, come from Natal—namely, a specimen from near Camperdown (*Medley Wood*, no. 4999), and a specimen in the Dublin Herbarium labelled "Attercliff, *J. Sanderson, Esq.*" It is possible that a larger series of specimens may show a more or less complete transition to *I. pellita* Hall. f., but whether or no the two are conspecific, it is worth while to have some account of a name, which, though included in the *Index Kewensis* and represented in herbaria by authenticated specimens, has nevertheless been overlooked by monographers.

Section PHARBITIS.

I. CREPIDIFORMIS Hallier f. in Engl. Bot. Jahrb. xviii. 131 (1893). *I. tanganyikensis* Baker in Kew Bullet. 1895, 70.

Var. MINOR, var. nov. Planta humilis caulibus ascendentibus quam in specie minoribus, foliis parvis lineari-oblanceolatis, interdum lineari-oblongis.

Shoots 17–28 cm. long, 1·5–2 mm. thick; lower leaves smaller than the upper, which reach a length, including the short petiole (2–3 mm.), of 3·5–4 cm. long by 5–6 mm. broad. Peduncles to 7 cm. long, scarcely more than ·5 mm. thick; flower-heads about 12 mm. across, the conical buds densely covered with a whitish silky pubescence. Bracteoles and sepals 1 cm. long, the latter reaching 1·5 mm. in breadth above the base, densely hairy on the back and margins. Corolla not quite 2·5 cm. long by 2 mm. in diameter at the base, apparently purplish in colour, the mid-petaline areas bounded by two strong nerves, with three less conspicuous nerves between.

Hab. British East Africa; Machakos, 5–6000 ft., *G. F. Scott Elliot*, no. 6391, 1893.

I. INVOLUCRATA Beauv. Fl. Owar. ii. 52, t. 89.

Rhodesia; Salisbury, *Dr. Rand*, no. 561, July, 1898.

I. PILOSA Sweet, Hort. Brit. 289 (1826).
Rhodesia; Bulawayo, *Dr. Rand*, no. 555, June, 1898.

I. KILIMANDSCHARI Dammer in Engl. Pflanz. Ost.-Afr. Th. C. 332 (Aug. 1895). *I. ficifolia* Lindl. var. *laxiflora* subvar. *parviflora* Hall. f. in Engl. Jahrb. xxviii. 35 (1899).

East Tropical Africa. "Higher slopes of Mt. Kilimanjaro up to 10,000 ft. above Morang," *Rev. W. E. Taylor*, 1888,

I cannot follow Hallier in uniting this species with the South African *I. ficifolia* Lindl. It is, I think, as near *I. pilosa* Sweet (= *I. dichroa* Choisy), and distinguished from both by the ovate-cordate leaves, with a flower smaller than that of *I. ficifolia*, and larger than that of *I. pilosa*.

I. Eenii, sp. nov. Suffrutex caulibus volubilibus albide- vel, in partibus junioribus, flavescente-pilosis; foliis breviter petiolatis, palmato-3-partitis, segmentis lanceolatis vel anguste ellipticis acutis, lateralibus cum lobo basale instructis, pagina superiore, margine, et venis primariis secundisque paginæ inferioris cum pilis flavescentibus indis, pagina inferiore venis exceptis breviter albo-tomentosa; petiolis pedunculisque ut in caulibus pilosis; pedunculis petiolos excedentibus 1- vel 2-floris; bracteolis ad flores approximatis, ad sepala similibus; sepalis lanceolatis, acuminatis, dorso pilosis et margine ciliatis, tribus interioribus quam exteriora angustioribus; corolla infundibuliforme calycem duplo superante, areis mesopetalis trinerviis; genitalibus inclusis; fructu . . .

The specimen consists of about 35 cm. of the upper part of two intertwining shoots which reach 1·5 mm. in thickness, and have a covering of soft whitish or, especially in the younger parts, pale yellowish hairs. The median leaf-segment reaches 2·5 cm. long by 8–10 mm. broad, the lateral are slightly smaller, and bear on the outside at the base a blunt roundish lobe 5–8 mm. long; petioles barely reaching 2 cm. long. Peduncles 2·5 cm. long, bracteoles immediately beneath the flower and resembling the sepals, but slightly smaller, 8–9 mm. long by 2 mm. broad. Sepals 11 mm. long, the outer 3 mm., the innermost 1·5 mm. broad. Corolla 2·5 cm. long, spread at mouth about 2·5 cm.; diameter of tube 6 mm., length about 1 cm. Filaments 6·5–9 mm. long. Ovary conical, style 6 mm. long, stigmas subrotund.

Apparently near *I. Magnusiana* Schinz, which I have not seen, but which has much smaller bracteoles and flowers, longer-stalked leaves, &c.

Hab. Dammara Land, *T. G. Een*, 1879.

I. Gerrardiana, sp. nov. Suffrutex volubilis, caulibus præsertim junioribus flavide-pilosis; foliis exacte cordatis, abrupte et breviter acuminatis, petiolum tenuem subæquantibus, in pagina superiore breviter et appresse pilosis, et sparsius in venis venulisque paginæ inferioris; pedunculis folia æquantibus vel brevioribus, ut pedicellis depresso-pilosis, sæpe a dichasio 3-floro terminatis, interdum 5-floris; bracteolis parvis linearibus caducis; sepalis subæqualibus elliptico-lanceolatis ad lanceolatis, acutis, dorso præsertim basi marginibusque hirsutulis; corolla alba, speciosa, ut apparet campanulate-infundibuliforme, calycem circa 3-duplo excedente, areis mesopetalis cum venis conspicuis binis limitatis; filamentis elongatis, valde inæqualibus; seminibus nigris, glabris.

Shoots hollow, subherbaceous, 2 mm. in diameter, somewhat hispidulously pilose, the yellowish hairs closely appressed on the younger parts. Leaves 2·5–5 cm. long, and as broad or slightly broader, thin and papery when dry, and, except the venation, glabrous on the lower face with subprominent spreading veins. Peduncles 2·5–6 cm. long; pedicels 6–10 mm. long, lengthening in fruit to 1·5 cm. Sepals 8–10 mm. long, the outer 2·5 mm. broad, the innermost about 1·5 mm. Corolla about 3 cm. long. Stamens slender from a broad hairy base, 9–14 mm. long; style 2 cm. long; anthers sagittate, 2·5 mm. long. Fruit about 7 mm. in diameter.

Closely allied to *I. purpurea* Lam., but distinguished by its smaller white flowers.

Hab. Natal; Ladysmith, April, 1861, *W. T. Gerrard*, no. 620. "Probably an annual; flowers small, white, showy."

(To be continued.)

ADDITIONS TO THE FLORA OF WEST LANCASHIRE.

By J. A. Wheldon and Albert Wilson, F.L.S.

Several brief excursions into West Lancashire during 1900 have resulted in the discovery of a number of species apparently new to the vice-county, and also fresh stations for several plants which are interesting on account of their rarity in this district, or because they are extinct, or are threatened with extinction, in the only localities hitherto published.

The number of new plants, some of them of considerable interest, in the following list affords proof that West Lancashire will amply repay further exploration, and it is obvious that any botanist deciding to assist in the investigation of its flora will not go unrewarded.

Plants not mentioned in our previous list published in this Journal for 1900 (p. 40), or in any of the publications there quoted, are distinguished by an asterisk, and are presumed to be now first recorded for the vice-county. Casuals, aliens, and denizens have the obelisk sign prefixed, while colonists and natives are undistinguished. As we were unable always to make our botanical excursions in company, our individual contributions are indicated by the abbreviations *Wh.* and *Wi.*; where no authority is quoted, the plant was found by the authors jointly.

We are much indebted to the Rev. W. M. Rogers for looking over our Rubi; through his kind assistance we have been able to considerably extend the known range of many of our forms; but a list of these does not fall within the scope of this article as defined in the opening paragraph. We have also to specially thank Messrs.

E. G. Baker, E. S. Marshall, H. & J. Groves, and F. Townsend, for naming critical species or confirming our own determinations. Without such help we should not have ventured to publish some of the species and varieties of the list.

Ranunculus Baudotii Godr. This has proved to be frequent in suitable localities near the coast, from Preston to the Heysham Peninsula.

†**Sisymbrium pannonicum* Jacq. (*S. Sinapistrum* Crantz). Scattered abundantly over a considerable area near the Wyre Docks, Fleetwood, and also more sparingly (one or two plants only) about Preston Docks, *Wh.*

†**Lepidium Draba* L. Near Morecambe, *F. A. Lees* (in *Naturalist*, 1900, p. 246). Wyre Docks, Fleetwood, very fine, June, 1900, *Wh.*

**Raphanus Raphanistrum* L. Fields near Preesall and Knott End, *Wh.* Near Overton and Heysham, *Wi.* This is quite a rare plant here, and these are the only records we have for it.

†*Reseda lutea* L. Plentiful with *R. luteola* near Preston Docks, July, 1900, *Wh.* By the Wyre, Churchtown, near Garstang, *Wi.*

**Viola tricolor* var. *Lloydii* (Jord.). We have found this growing abundantly about the margins of Cockerham Moss, and in similar situations elsewhere. It seems to prefer newly cultivated soil that has been recently reclaimed from the moss tracts. Sometimes the upper petals are yellow, but they are usually more or less deeply suffused with purple, and examples may be found with both kinds of flowers on one plant. Mr. E. G. Baker, who kindly confirmed our naming of these plants as above, points out that Jordan's description embraces this yellow-flowered state.

†**Saponaria officinalis* var. *puberula* Wierzb. Plentiful on both banks of the river Lune near Caton, and descending to Halton, Aug. 1900, *Wh.* This agrees with the Hightown plant in everything but size, the former being somewhat taller. The congested heads of flowers have a markedly different facies from the ordinary plant, which grows by the Ribble to the east of Preston, &c. Mr. Groves informs us that this latter is never entirely glabrous.

**Spergula arvensis* L. var. *vulgaris* (Boenn.). Field near Preesall, *Wh.*

**Hypericum dubium* Leers. Bank of the river Lune near Arkholme, Aug. 1900, *Wi.*

Radiola linoides Roth. Arkholme Moor, Aug. 1900, *Wi.*

Geranium pusillum L. Roadside between Caton and Halton, Aug. 1900, perhaps of only casual origin ? *Wh.*

†**Impatiens Noli-tangere* L. We are indebted to Dr. F. A. Lees for calling attention to this being a West Lancashire plant (*Naturalist*, Sept. 1900, p. 279). He says: "The Hindson station of Baker's Flora—Ghyll near Whittington Hall, south-west of Kirby Lonsdale—is in vice-county 60, West Lancaster. I saw plants in a Kendal garden brought thence." This locality, which is inserted in Baker's *Flora of the Lake District* as in Westmoreland, is about one mile south of the Westmoreland boundary.

†**Medicago sativa* L. Plentiful on waste ground by the railway in

Fleetwood Docks, and with it †**Vicia villosa* Roth and an abundance of †**Melilotus indica* All., *Wh.*

Rubus fissus Lindl. By a ditch-side near Abbeystead, Wyresdale, and near Bailey Hey, on the north side of Beacon Fell, *Wi.*—**R. plicatus* Weihe. Abundant on Cockerham Moss, June, 1900.—*R. erythrinus* Genev. North bank of the river Wyre near Preesall, *Wh.* Hedges by the roadside, Lower Grizedale, near Garstang.—*R. nemoralis* var. *silurum* Ley. By the roadside across Lancaster Moor, Aug. 1900, *Wh.*—*R. Scheutzii* Lindeb. Emmets, Over Wyresdale, Sept. 1900.—*R. rusticanus* Merc. A fine form of this is not uncommon in West Lancashire, distinguished by its white flowers, broad-based somewhat pyramidal panicle, and flat leaves. Mr. Rogers says of it: "A very marked form which I have occasionally met with, but have no separate name for."—**R. Drejeri* G. Jensen. Roadside near the reservoir, Longridge, 24 July, 1900, *Wh.* Mr. Rogers writes: "You may put this to *R. Drejeri* without hesitation, as a form going off type towards my var. *Leyanus*, but still under the type."—**R. cinerosus* Rogers. In one or two places near Preesall and Knott End, Aug. 1900, *Wh.*—*R. infestus* Weihe. Caton Moor, Sept. 1900. This never occurs in quantity with us. In all our recorded stations, both in West and South Lancashire, only single bushes were found.

Potentilla procumbens Sibth. Lancaster Moor and near Quernmore Park, *Wh.*

**Agrimonia odorata* Mill. Lane near Melling, Aug. 1900, *Wi.*

Rosa canina L. var. *dumalis* (Bchst.). Emmetts, Over Wyresdale, Sept. 1900.—Var. *urbica* (Leman). Bank of the Wyre, Preesall, Aug. 1900, *Wh.* "On the whole, perhaps nearest to this variety, but differing from it in the glandular petioles and bracts." W. M. Rogers.—**R. glauca* Vill. Emmetts, Over Wyresdale, Sept. 1900.—*R. arvensis* Huds. A handsome form of this, occurring about Longridge and Grimsargh with the ordinary form, is stated by Mr. Rogers to be "a glandular form (or hybrid?) approaching Baker's var. *gallicoides*."—*R. mollis* Sm. This is very frequent and variable in the hilly districts of West Lancashire.

Cratægus oxyacanthoides Thuill. Ascends to 1100 ft. on Mallow dale Fell, where its large oval fruits tipped with the multiple styles are quite ripe, when those of var. *monogynia* (Jacq.) at a similar elevation are still hard and just commencing to change colour.

Peplis Portula L. Muddy pool near Overton, in the Heysham peninsula, *Wi.* As the plant has long been lost at the Ribbleton Moor station, it is pleasing to be able to restore this to our list of existing species.

†**Carum Carvi* L. Alien in Outermoss Lane, Morecambe, *F. A. Lees* (*Naturalist*, Aug. 1900, p. 246).

**Silaus flavescens* Bernh. Frequent in pastures about Cantsfield, July, 1900, *Wi.*

**Caucalis nodosa* Scop. Near Borwick and Carnforth, June, 1900, *Wi.*

†*Senecio saracenicus* L. Banks of the Lune near Melling, *Wi.*

**Lactuca virosa* L. Waste ground near the Wyre estuary, Fleetwood, *Wh.*

**Trientalis europæa* L. In great abundance on both sides of Black Clough, Marshaw Fell, Wyresdale, June, 1900. It was growing under thickets of deep bracken for a distance of about five hundred yards, at an elevation of from 750 to 1050 ft., *Wi.* This plant is singularly rare in the north of England on the west side of the Pennine range of hills.

**Centunculus minimus* L. Arkholme Moor, alt. 300–360 ft., Aug. 1900, *Wi.*

Erythræa littoralis Fr. Near Middleton, *Wi.*

†*Symphytum officinale* L. Near Wennington, May, 1899, *Wi.*; and south bank of the Lune, Caton, *Wh.* The pale-flowered form.

**Lithospermum arvense* L. Between Silverdale and Carnforth, Oct. 1900, *Wh.*

†**Linaria viscida* Moench. By the railway near Leck, *Mr. L. Petty*; and in a similar situation at Longridge, *Wh.* On shingle by the Lune near Melling, *Wi.*

**Limosella aquatica* L. By the margins of brackish pools on Overton Marsh, Aug. 1900, *Wi.*

Veronica polita Fr. Garden weed at Caton, *Wh.*

Euphrasia nemorosa H. Mart. Lancaster Moor, and many other localities. Our commonest form. — **E. borealis* Towns. Lower Salter, and roadside banks at the foot of Catshaw Greave.— **E. curta* Fr. var. *glabrescens* Wettst. Coast-banks near Little Bispham, July, 1900, *Wh.* Examples were sent to Mr. Townsend as *E. curta*, but he thought them better placed under this variety, and kindly sent us specimens, with which ours undoubtedly agree.

**Scutellaria minor* Huds. Whittington Moor and Arkholme Moor, Aug. 1900, in the latter station growing with *Radiola linoides* and *Centunculus minimus*, *Wi.*

†*Lamium maculatum* L. Knott End and Alston, *Wh.* — **L. amplexicaule* L. Near Lytham, Oct. 1900, *Wh.*

†**Amaranthus Blitum* L. On ballast in Preston Dockyard, and with it a few specimens of **Ambrosia trifida*, *Wh.*

†**Chenopodium ficifolium* Sm. Ballast-heaps not far from the railway embankment outside the Wyre Docks, Fleetwood, with *C. rubrum* L. and *C. murale* L., Aug. 1900, *Wh.*

**Atriplex Babingtonii* var. *virescens* Lange. Sparingly amongst shingle in the Lune and Wyre estuaries, *Wh.*

**Suæda maritima* Dum. var. *procumbens* Syme. Saltmarsh, to the south of Glasson Dock, *Wh.*

Salix phylicifolia L. Near Marshaw, Wyresdale, *Wi.*

Listera cordata Br. Moor above Gavell's Clough, head of Wyresdale, *Wi.*

Juncus diffusus Hoppe (*J. effusus* × *glaucus*). In some quantity between Grimsargh and Alston, *Wh.*

**Lemna polyrrhiza* L. In the canal between Galgate and Glasson, Sept. 1900, *Wh.*

**Eleocharis multicaulis* Sm. Boggy ground in Thornley Quarry (limestone), near Chipping, July, 1900, *Wi.*

Scirpus fluitans L. Ditch near Bare Railway-station, *Wi.* The second locality only in the vice-county for this. — **S. maritimus* L. var. *compactus* Koch (*conglobatus* S. Gray). Near the Wyre mouth, *Wh.* Ovangle, on the Lune estuary, *Wi.*

Rhyncospora alba Vahl. Tarnbrook Fell, Wyresdale, amongst *Vaccinium Oxycoccos* and *Sphagnum medium.* These three are also closely associated on Cockerham Moss. This latter locality is being so altered by drainage that the *Rhyncospora* is in danger of being lost; therefore this additional station is a welcome discovery.

**Carex vulpina* L. var. *nemorosa* Kit. Near Little Bispham, and by the canal between Galgate and Glasson, *Wh.* Here the plant generally grows by open ditches and canal-sides, and we have it verified by Mr. Bennett from similar situations in Yorkshire. It cannot therefore be considered to be a mere shade form.

†**Phalaris minor* Retz. On ballast near Preston Docks, *Wh.*

†**Anthoxanthum Puellii* Lec. & Lam. Between the rails on the railway through Preston Docks, *Wh.*

†**Apera Spica-venti* Beauv. A few plants with the last two in Preston Docks, *Wh.*

**Agrostis palustris* Huds. var. *coarctata* (Hoffm.). Very fine on waste ground near the Wyre embankment, south-east of Fleetwood, Aug. 1900, *Wh.*

**Aira caryophyllea* L. Embankments on both sides of the Wyre near Preesall and Fleetwood, July, 1900. *Wh.* Overton, in the Heysham peninsula, *Wi.*

Poa nemoralis L. Near Cantsfield and Melling, *Wi.* Wood by the Lune near Caton, *Wh.* — *P. compressa* L. Plentiful near Glasson, at the edges of the footpath near the railway-station, growing with *Festuca rigida,* Sept. 1900, *Wh.* In the only previously known locality it was in small quantity, and is perhaps lost.

**Glyceria plicata* Fr. Between Grimsargh and Alston, *Wh.*

†**Lolium italicum* Braun. Fleetwood Docks, *Wh.* Weed in fields near Winmarleigh.

Hordeum murinum L. Near the Ferry, Fleetwood, *Wh.* A singularly rare grass in West and many parts of South Lancashire.

Cryptogramme crispa R. Br. Some fine plants among millstone grit rocks on white side of Tarnbrook Fell, Wyresdale, *Wi.*

Chara vulgaris* L. Stonyhurst and Crowshaw Reservoir. Quarry near Leagram Mill, *Flora of Stonyhurst.* Pools in Thornley Quarry, *Wi.* — **C. vulgaris* var. *longibracteata* Kuetz. Pond near Middle Lane, between Blackpool and St. Annes, Oct. 1900, *Wh.*—C. fragilis* Desv. Below Cowan Bridge, Leck, *Mr. L. Petty.* Near Leighton Beck, Silverdale, *Wi.*

**Nitella.* A handsome form, abundant in Grizedale Reservoir, which Messrs. Groves think may be either *N. flexilis* or *N. opaca,* has unfortunately not yet been found in fruit.

THE BOX IN BRITAIN.*

In conversation last year with Graf zu Solms-Laubach he made the extremely interesting suggestion that the Box and Yew trees of Box Hill might probably be the remains of a native forest which originally clothed the North Downs. Among his arguments against their being the remains of a plantation, he urged the great unlikelihood of such a soil as that of Box Hill being planted at all, and the still greater improbability of any one hitting upon such a combination as Box and Yew for the purpose. He urged that, since it is probably the only thing of its kind in the world, careful enquiry should be made into its history.

I have been able to make a few superficial enquiries to the following effect, and it will be seen that the subject is worth pursuing by some one with leisure and other advantages, which I do not possess. Mr. Warner, of the Manuscripts Department, has been good enough to search Domesday Book for me, but without result. He makes the suggestion that the old Court Rolls of Dorking be searched—if they can be found. He further sent me the following extract from Manning and Bray's *History of Surrey*, vol. i. p. 560 (1804):—

"The *Downs*, which rise to a considerable height from the opposite bank of the *Mole*, are finely chequered with *Yew* and *Box* Trees of great antiquity, and which form a scene no less venerable than pleasing. Of the latter of these, in particular, there was formerly such abundance, that that part of the Downs which is contiguous to the stream, and within the precinct of this Maner, hath always been known by the name of *Box Hill*, from which also is an extensive prospect into the neighbouring counties. Various have been the disquisitions concerning the antiquity of this plantation; which, however, for aught that has hitherto appeared to the contrary, may have been coëval with the soil. Here was formerly also a *Warren* with its *Lodge*; in a lease of which from *Sir Matthew Brown* to *Thomas Constable*, dated 25 August 1602, the Tenent covenants to use his best endeavours for preserving the Yew, Box, and all other trees growing thereupon; as also to deliver, half-yearly, an account of what hath been sold, to whom and at what prices: and in an account rendered to *Ambrose* his son by his Guardian, of the rents and profits for one year to Michaelmas 1608, the receipt for *Box* Trees cut down upon the Sheep Walk on the Hill, is 50 *l*. I have seen also an account of the Maner, taken in 1712, in which it is supposed that as much had been cut down within a few years before as amounted to 3,000 *l*."

I forwarded this extract to Graf zu Solms-Laubach, who replied in an interesting letter, of which the following is a translation:—

"Many thanks for your information, which I have received with the greatest interest. It is really sufficient in itself to clear up the subject, although it would be interesting to find still older proofs. If, however, box-wood was sold in 1608 for £50, it is clear that the woods must have been in existence in 1500, at which time there can hardly have been intentional planting of woods in England [?].

---

* Recorders of coincidences may like to note that the two following communications, written independently of each other, reached us in the same week. —Ed. Journ. Bot.

"It is much to be desired that either you or some younger London botanist should write a paper on the woods of Dorking, with a map showing the extent and distribution of the existing tracts of box. For one does not know how far these stretch westwards. It would be a subject of the greatest interest in plant geography, and one which can only be worked out by an Englishman who can go over the ground on foot and talk to the various land-owners. The general distribution of the plant, which in Europe is, broadly speaking, Mediterranean, should be noticed. I no longer doubt that *Buxus* belongs to the palæotropical forms, which have outlived the ice age, and have once more penetrated to the north-west—as *Sticta aurata* to Brittany; *Hymenophyllum tunbridgense*, *Isoëtes Hystrix* to Guernsey; *Lagurus ovata*, *Erica vagans*, &c. Of these the greater part of the Mediterranean things are of course not palæotropical, but *Sticta aurata* and *Hymenophyllum* may be reckoned in the category. Such a work would be therefore well worth doing; and I must say I am surprised that no one, knowing the wonderful woods of Box Hill and their flora, which must of course be taken into account, should have taken up the subject. It is evident that on your side of the Channel you hardly realize the botanical marvels you possess in your woods."

Looking further quite casually into Manning and Bray's *History*, I could not help being struck by the occurrence of old personal names, such as Peter de Boxstead (p. 90), Nicholas Boxwell (p. 341), William Box (vol. ii. p. 584), and at vol. ii. p. 656, a "Mr. Boxall sold 500 Yews at three guineas each." These names are strictly local, and Boxley in Kent and Boxgrave in Sussex occur to me as place names, as I write.

I find in Messrs. Hanbury and Marshall's *Flora of Kent*, p. 310, under *Buxus*—

"Boxley—Ray in Camden 262. Mr. Reeves doubted its being truly indigenous here; but the fact of the village being apparently named after it is a strong argument in favour of its genuine wildness. It seems to have been more plentiful there formerly than at the present time . . . . .

First Record 1695. "Buxus I find in the notes of my learned friend Mr. John Aubrey that at Boxley (in Kent) there be woods of them.—Ray *l. c.*"

In Mr. Druce's *Flora of Berkshire*, p. 439, I find the following note under *Buxus*:—

"The last remains of Boxgrove in Sulham parish near Reading, whence the country probably took its name, were grubbed up about forty years ago."—Gough's Camden, 155, 1789.

"Prof. C. C. Babington, Jan. 28, 1853, sent a note to the Phytologist Club as follows:—'Mr. Watson, in his *Cybele*, ii. 366, appears very much inclined to consider the Box-tree as not originally a native of England. The following extract from the beginning of Asser's *Life of King Alfred* appears to show that it was plentiful in Berkshire 1000 years since. His words are—'Berrocscire; quæ paga taliter vocatur a 'berroc' sylva ubi buxus abundantissime nascitur.' See Phyt. iv. (1853), 873.

"In the edition of Camden published in 1610, it states that 'Asterius Menevensis deriveth the name [of the county] from a certaine wood called Berroc, where grew good store of Box.'

"At Buckland there are some very fine specimens of the Box, and it is also well grown at Besilsleigh, Kingston Bagpuze, and at Park Place, where Mr. Stanton tells me it reproduces itself from seeds in the woods. In Mavor's *Agr. Berks* it is said to grow near Wallingford.

"The Box is a possible native of Surrey at Boxhill, and on the Chilterns near Velvet Lawn and near Dunstable, Bucks. In the other bordering counties it is certainly introduced."

It is certainly a prevalent idea, that as Buckinghamshire is the country of the Beech, so Berkshire is the country of the Berroc or Box, but I understand that there may be philological objections to it. If true, it would most strikingly confirm Graf zu Solms-Laubach's most ingenious idea. The matter is certainly worth prosecuting, and I print these few notes in the hope of inciting some young botanist to so attractive a task.

G. R. M. MURRAY.

IT has hitherto been considered doubtful whether the Box is indigenous in Britain—some botanists excluding it, and others admitting it, more or less doubtfully, as a native. Watson does not mention it in *Topographical Botany*, and in the *Cybele* calls it a "denizen." Syme (*English Botany*, ed. 3, viii. 94) considers that there is "some likelihood of its being truly native on Boxhill, Surrey," the only other counties in which there is "any possibility of its being a genuine native" being Kent, Bucks, and Gloucester. My attention being drawn to the subject by a reference in a letter from Sir J. D. Hooker as to its occurrence in the last-named county, I have endeavoured, with the kind assistance of Mr. G. H. Wollaston and Mr. J. W. White, to throw some light on the question.

The Box wood to which Sir Joseph referred is situated between Wootton-under-Edge and Alderley, clothing the hill-side for a considerable distance; although the shrub flourishes luxuriantly and produces abundance of seedlings in the wood itself, it does not appear to have extended into the neighbouring wooded hill-sides and valleys. There is nothing here to indicate whether it is native or not, except the presence of some larches, which, being introduced trees, would perhaps suggest a similar origin for the Box. It is shown as a wood both in the one-inch and six-inch Ordnance maps, the fact that it consists of Box not being in any way indicated; but about three miles away, nearly due east, in a valley which extends in a north-easterly direction from Alderley, there is marked the name of Boxwell, suggesting that some traces of the Box might be found there. On visiting the locality this proved to be the case;

another large wood, consisting exclusively of Box, occupies a similar position to that at Wootton, and extends for half a mile or more on the steep side of the valley. It was afterwards found that this is marked as "The Box Wood" in an old Ordnance map published about fifty years ago, as well as in the six-inch map; but this is omitted in the recent one-inch map, in which only the names "Boxwell Court" and "Boxwell Farm" are to be found.

The name thus being evidently connected with the wood, a search was made to discover, if possible, how long it had been in use. The following interesting account was found in the *History of the County of Gloucester*, by the Rev. Thomas Rudge, published at Gloucester in the year 1803:—"Boxwell, anciently Boxewelle. The name is derived from a box wood of about sixteen acres, within a warren of forty acres, from which rises a plentiful spring. This is the most considerable wood of the kind in England, excepting Boxhill in Surrey, and from the name, which has now been on record for more than seven centuries, it must have been of long standing."*

This appears to leave no doubt that the Box is indigenous in this valley, and there can therefore be no reason why it should not also be a native of the woods at Wootton and Boxhill. Sir J. D. Hooker, to whom I have communicated the result of this investigation, tells me that it leaves no doubt in his mind that the plant is truly wild in these localities, and adds that Bentham, whose knowledge of the conditions under which British plants are found on the Continent was profound, regarded it as a native.

CEDRIC BUCKNALL.

ROBERT SMITH
(1873–1900).

[A promising career has been cut short by the early death of Robert Smith, which took place at Edinburgh on the 28th of August last, from appendicitis, after an illness of only one day's duration. He was born in Dundee on Dec. 11, 1873, and had been intended for a business career, but the attractions of science proved too strong for this, and he became an assistant under Prof. D'Arcy Thompson in the zoological museum of the College, where he had previously been a student, and where he took his B. Sc. degree in 1896. Soon after this, he became Demonstrator in Botany under Prof. Patrick Geddes, and from that time devoted himself to plants. Prof. Thompson contributed a biography of Smith to *College Echoes* (the students' Journal for the University) for Nov. 9th, and this, with his permission, we reproduce, feeling confident that many of our readers will like to know more of so interesting a personality.

For the accompanying portrait we are indebted to the Scottish Geographical Society, in whose *Transactions* it appeared.]

---

* ["At Boxwel in Coteswold in Gloucestershire, and at Boxley in Kent there be Woods of them. *Mr. Aubry's Notes.*" Raii Syn. ii. 310 (1696). — ED. JOURN. BOT.]

From early boyhood Smith had been a diligent student of plants; he was a competent botanist before ever he came to College. He had a natural instinct for the study of form and the discrimination of species, an unbounded love of the plants themselves, a knowledge surprisingly wide and intimate of the mosses and higher plants of the whole British flora. Until four years ago, some modest excursions in the Scotch Highlands, a summer's journey to Norway with other students of my own, and a visit to the West of Ireland also in my company, had been the measure of his opportunities for outdoor study. In the winter of 1896–7, as Research Scholar of the Franco-Scottish Society, he had the good fortune to study under Professor Charles Flahault at the University of Montpellier. Under a distinguished and inspiring teacher, in a region vastly rich and attractive to the eye of a northern student, and stimulated by example and competition in an active and cosmopolitan school, Smith worked with sedulous energy, and came home with his mind prepared and determined for the work that afterwards occupied him to the end. This chosen task was to be the Botanical Survey of his own country.

For some years past, on the Continent and in America, a certain school of botanists have occupied themselves with the study of plant-distribution in a more far-reaching manner than has been customary with us. Instead of merely noting the local occurrence of isolated plants, species by species, it is the business of these students, with more comprehensive insight, to discriminate certain assemblages of plants that for one reason or another are linked together in definite association. The beech and the oak, the larch and the pine, the bent upon the links, the heather on the moor, have each associated with them a multitude of tributary and interdependent species; and ere we can understand these complex social aggregates, and ere we begin to account for their nature and their distribution, we are involved in a network of problems—biological, meteorological, chemical, and geological. In the study of these difficult and very interesting problems Professor Flahault is a leader and pioneer. With him Smith made long journeys over the South of France, from the Pyrenees to the Italian Riviera, a country most admirably adapted to illustrate the methods of research involved, by reason of the great diversity and the clear lines of demarcation of the many distinct areas of vegetation contained within it.

On his return home Smith began at once, not ignorant of and not deterred by the magnitude of the task, to map out the botanical topography of Scotland. Single-handed and with tireless industry he began and continued this task, travelling on foot incredible distances, and recording faithfully an immense multitude of details. Of much of this work the record is unfinished; some of it is labour that has been spent in vain. But happily Smith lived to bring part of it to completion and to see its first-fruits harvested.

His first publication of importance was a paper on "Plant Associations of the Tay Basin," read before the Perthshire Society of Natural Science, [the first part of which was] published in the *Proceedings* of that Society in 1898 [and the second and concluding portion, accompanied by an excellent map, in the same *Proceedings* for 1899–1900, pp. 69–87]. Short though it was, this paper attracted the attention of so high an authority as Professor Engler of Berlin, who makes special reference to it in a recent Memoir on the History of Plant Geography as being the first attempt to apply to the vegetation of Britain the modern methods of topographical research. In the beginning of 1899 Smith published in *Natural Science* a paper "On the Study of Plant Associations," a clear and concise exposition of the literary history of the subject; and in May of this year he was invited to give a lecture before the Royal Scottish Geographical Society in Edinburgh on his Botanical Survey of Scotland. He told me, with pleasure and gratitude, of the warm praise he received on this occasion from Sir John Murray, and, in particular, of the cordial and generous encouragement given him by Mr. Benjamin Peach, of the Geological Survey.

The publication of certain of his maps was undertaken by the Society, and two of these, representing the districts of Midlothian and of Northern Perthshire, appeared, accompanied by descriptive articles, in the July and August numbers of the *Scottish Geographical Magazine*. These maps are an enduring monument to his talent and his devotion. . . . .

As a teacher, no less than as a student, Smith was painstaking and successful. His lectures were models of careful preparation. With a high view of his duty towards his students, he never spared himself in their service. He had a faculty of exposition such as does not always accompany even the soundest knowledge of a subject, and his unaffected enthusiasm for his science could not fail to arouse his students' sympathy and interest.

Looking back now, where but a little while ago we thought only of looking forward, it behoves us not to estimate the measure of his work without remembering the difficulties against which he had to contend, and towards all of which he bore himself cheerfully and manfully. And writing these few lines as a tribute to his memory, my thoughts dwell not more upon his scientific work than on his personal character, for it was beyond common measure pure and lovable.

D. W. T.

A DISEASE IN TURNIPS CAUSED BY BACTERIA.

By W. Carruthers, F.R.S., and A. Lorrain Smith.

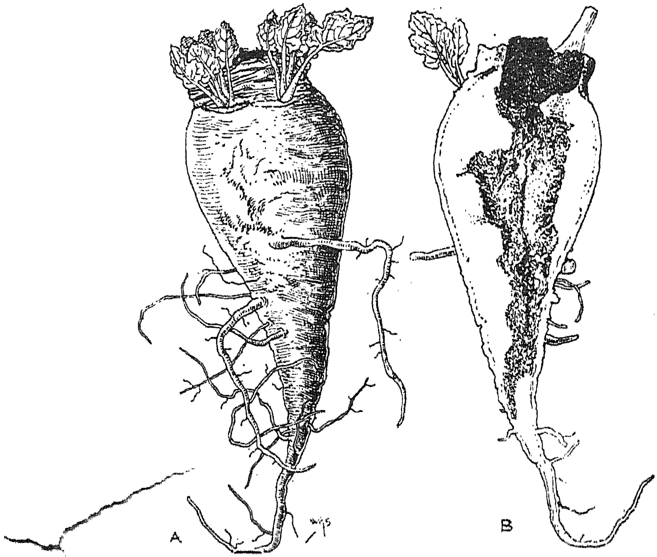
[This memoir was prepared for the Royal Agricultural Society. By permission of the Society it appears here contemporaneously with its publication in the Society's Journal, but with a few technical additions for scientific readers.—Ed.]

For some years we have been acquainted with an injury to turnips, the cause of which we were unable to discover. The injured turnips had the crown of young leaves destroyed, and a cavity scooped out of the turnip occupied the top immediately below where the leaves had grown. The cavity was empty; its wall was of a dark brown colour, and the tissues were protected by the development of a corky layer. There was no indication of injury in the turnip beyond the wall of the empty cavity. The first specimen was received seven years ago, and some years later other specimens were obtained; they threw no light on the cause of the injury. It seemed probable that the injury was due to bacteria, but we did not discover any evidence of their presence.

At the beginning of August, 1900, a number of badly diseased swede turnips were sent from the valley of the Nibb, in Yorkshire, in order that the nature and cause of the injury might be determined. In the worst cases the young leaves had disappeared from the crown or were rotting away; the outer older leaves also showed signs of wilting, their stalks were decaying at the base, and a number of lateral buds were shooting up from the axils of these older leaves. As a rule, the outer skin of the turnip was intact, In some instances the top was as if scooped out, and the depression lined by a whitish slimy substance. In others the injury had further penetrated through the turnip to the base, and the whole centre was a mass of rotten pulp. Even in the plants less seriously affected, it was evident from the condition of the younger leaves that they were being cut off from their connection with the root. Some of the turnips had wounds at the side, through which the bacteria gained access, forming starting-points of disease in addition to the injury at the top of the bulb. In the specimen figured an older cavity was found agreeing with the injury already observed.

From the base of this cavity a later attack was developed. This, with other characters, clearly established that it was the mysterious disease we were dealing with. Some of the turnips were suffering from Finger and Toe, which was of course quite distinct from the rottenness that was destroying the turnips.

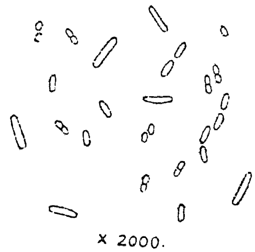
A careful microscopic examination of leaf and bulb was made, and it was found that the injury was due to bacteria, which had gained access to the living plants between the bases of the young leaves or through the broken surface of the bulb. They were advancing into the substance of the turnip from cell to cell, destroying the tissues as they went. Sections were taken from the diseased parts and examined, and myriads of the bacteria were seen in the cells. They were motile, cylindrical rods, exceedingly minute, the longest about seven times as long as they were broad; they measure ·65 μ in breadth, and from 1· to 4· μ in length. The larger rods multiplied by division into two and four, and thus they varied greatly in length, though not in width.



Turnip attacked by bacteria. — A, external aspect, showing the crown killed and new growth from the axils of the first leaves, which had naturally fallen off; B, section of the same turnip, showing the crown of the turnip destroyed, the hollow cavity produced by the first stage of the disease, and the further injury by the bacteria in the centre of the turnip. Both half natural size.

Some of the slimy substance from the cavity at the top of the turnip was stained and examined, and was found to be crowded with the same bacteria. Cultures were tried in a mixture of gelatine and turnip decoction by introducing into the mixture the bacteria taken from different parts of the diseased swedes, the medium and instruments being carefully sterilized; and little colonies of very active rods were formed in a day or two, which liquified the gelatine, Unfortunately, there was no opportunity at the time of infecting healthy swedes from these colonies, and of following the entire life history of the bacteria.

As a careful field examination seemed desirable, a visit was made to the injured crops in Yorkshire. The disease had advanced very rapidly; fields of swedes that appeared healthy and thriving a fortnight previously were now completely blighted. In the worst field, twenty-five acres in extent, not one turnip in five seemed to have escaped. Yellow turnips had suffered very little, though here and here a few plants growing on the head rows of the fields containing diseased swedes were attacked; cabbages growing near were also diseased, but a strip of kohl-rabi right through the centre of a severely diseased crop was quite healthy.



Bacteria which cause the disease in the turnip. Magnified 2000 diameters.

The kohl-rabi appears so far to be immune, and cabbages and yellow turnips are probably safe when not in contact with a diseased crop. The mangolds growing in the same field were not in the least attacked. In all cases the bacteria had lodged in the central bud, by destroying the tissues of the turnip below, so that the young leaves were cut off from their connection with the root, and they speedily withered and died. Where circumstances favoured the development of the bacteria, they increased rapidly, and the whole interior of the root from the crown downwards was soon destroyed.

For the information of farmers, who in some districts were alarmed at the serious injury to their crops, a letter was published four months ago in the *Times* and other daily papers, and in the *Agricultural Gazette*, giving a general account of the nature of the disease, and suggesting steps to be taken to prevent its spreading.

The disease worked great havoc in Yorkshire, and the same injury was reported from two localities at a distance from each other in Dumfriesshire. At a later period the progress of the disease was to a large extent arrested. This no doubt arose from the destruction of so many leaves, which left the rows somewhat bare. Sunlight and air gained free access to the bulbs, and the bacteria were dried up or destroyed.

Many investigators in recent years have experimented on the influence of sunlight on bacteria, and have proved that in most cases they develop only in darkness. In 1877 and 1878 Downes and Blunt found that, while their growth was retarded by the influence of diffused white daylight, it was completely stopped by sunshine. Another observer found that the destruction of germs was more rapid and complete when there was also a free admittance of air, though one of the most recent workers in this field, Professor Marshall Ward, has shown that the sun's rays alone are sufficient to kill them. He confirmed this view by exposing to the light plate cultures of the spores of the anthrax bacteria covered with pieces of cardboard, out of which figures and letters had been cut, thus allowing the direct influence of the sun to act on the well-defined areas cut out of the card. The spores were inactive on the exposed patches, the gelatine remaining clear, while the darkened parts underneath the cardboard were opaque with the crowded colonies of bacteria that had developed from the spores.

The same influence appears to have been equally powerful in the turnip-field, for in many cases the only trace of injury left was a clean walled cavity at the top of the turnip, from which no information could be gathered as to its origin.

It is very doubtful whether any true reparation of the injury followed the growth in the lateral buds. These young growths could not arrest the progress of the bacteria in the turnip, much less could they repair the injury that had been done.*

SHORT NOTES.

Aublet's 'Histoire des Plantes.'—Dr. Otto Kuntze, during his recent visit to this country, called my attention to a peculiarity in the Kew copy of Aublet's *Histoire des Plantes de la Guiane française:* namely, at p. 440 there is a genus *Tamonea* established, completed on the following page with the specific name *guianensis*. This had been duly registered in the *Index Kewensis*, but he had not been able to verify the citation in any copy on the continent. On further examination it was seen that the *Tamonea* on p. 440 was not indexed by Aublet, but *Fothergilla admirabilis* was given instead. I have since then referred to such copies of the book as I could find in London, with this result, that the Banksian copy at the Natural History Museum is like the Kew copy, while the copy in the Linnean Society's Library, and two copies in the British Museum at Bloomsbury, are like those described by Dr. Kuntze—that is, at the place mentioned the name is changed to *Fothergilla admirabilis*, and on the plate (t. 175) to *mirabilis*. I can only suggest that the author found out when indexing that he had printed two genera *Tamonea* (pp. 440, 659), and consequently cancelled the two leaves, pp. 339–442; the issue of the uncorrected copies must have been accidental. It would be interesting to know if any other copies are like those at Kew, and the Botanical Department, British Museum.—B. Daydon Jackson.

New British Hepaticæ.—During a fortnight's visit in June, 1900, to the Ben Lawers district of Perthshire, I added the following hepatics to our flora:—*Cephalozia pleniceps* (Aust.) c. per., growing with *C. bicuspidata*, Craig-an-Lochan, alt. 1800 ft., on a rocky bank close to the stream which flows into Allt a'Mhoirneas near its exit from Lochan na Larige. Mr. Pearson has confirmed the name.—*Jungermania atrovirens* (Schleich.) Dum. c. per., Craig-an-Lochan, alt. c. 2100 ft., on wet rocks by the side of the stream which comes out of Lochan Tarbh Uisge, and between the landslip and the rock cleft. This plant certainly comes near small *J. ripària*, the only difference which I can see being that the perianth is oblong-ovate instead of pyriform as in the latter. I have expected for some time that this plant occurred in Britain, and have asked correspondents at various times to send me specimens of small *riparia* in the hope of finding it, but the Perthshire plant is the only one which I have seen. I think, however, that it will be found in other places, especially in limestone districts, and not necessarily on hills. Herr Kaalaas has confirmed the name of the Craig-an-Lochan plant.—*J. quadriloba* Lindb. in Arn. & Lindb. Musc. Asiæ bor. p. 55 (1888), Craig Chailleach, alt. 2800 ft., in some quantity on rock ledges on the east side of the hill going from the end of the fence to the summit. Herr Kaalaas writes of this plant: "Your specimens of *J. quadriloba* are rather small, and the leaves sometimes trifid instead of quadrifid; but in the form of the lobes and the sinus they exactly resemble our Norwegian plant." This is a well-marked species, but might be overlooked for *J. Flœrkii* or *J. lycopodioides*. It has hitherto only been found in the North of Europe.—*J. polita* Nees, on wet ground in two localities in the western ravine of Ben Lawers, on the east side of the main stream, between 2700 ft. and 3300 ft. This is a very interesting addition to our flora, and is a well-marked species. The name has been confirmed by Messrs. Pearson and Slater and Herr Kaalaas.—*Nardia subelliptica* Lindb. ex Kaalaas, De Dist. Hep. in Norveg. p. 386 (1893), c. per., Craig-an-Lochan, alt. c. 2000 ft., close to the locality for *J. atrovirens*, and near the stream. Herr Kaalaas writes of my plant: "The specimens of *N. subelliptica* are a little larger than the plants I have seen from Norway, but in all essential characters they agree very well with the original specimens of Lindberg, especially in the form and structure of the perianth." Although I was able to identify it from the description alone, I cannot yet see how it differs further from *N. obovata* than the alpine form *J. sphærocarpa*, the *J. lurida* Dum., differs from that species. I do not, however, understand the difference in the perianth which Herr Kaalaas apparently considers of much consequence; in his De Dist. Hep. in Norveg., it is given as *species distinctissima*. I do not think that the colour of its rootlets is a character of much consequence, as I observed that ordinary *N. obovata* on Ben Lawers had frequently more white rootlets than the low ground plant has, and the rootlets of the Perthshire *N. subelliptica* have occasionally a faint reddish tinge.—Symers M. Macvicar.

---

* Some days after this paper was in type for the Royal Agricultural Society's Journal, Prof. Potter read to the Royal Society a paper giving the results of investigations he had been making on this turnip disease. By his kindness we received a proof of his paper the day before it was read. He named the bacterium *Pseudomonas destructans*.

Tortula cernua (Hueb.) Lindb. in Britain. — Mr. George Webster, of York, is to be congratulated on being the discoverer of this interesting and latest addition to the British Moss Flora.

It was found in the last week of September of this year, in the magnesian limestone district, near Aberford, in the West Riding of Yorkshire; and, now that attention is called to it, there is but little doubt that it may be found in other parts of the kingdom where similar strata are to be found, it being chiefly a limestone-loving plant, of moist situations, but of arctic type. It is a very distinct species, and not likely to be confounded with any other species of the genus; distinguished by its short stumpy capsule with scarcely, if at all, twisted peristome, also its oblong-lanceolate tapering leaf with reddish nerve, and large lax cells. The specimens have been very carefully examined, not only by Mr. Webster and myself, but also by Mr. M. B. Slater, of Malton, and by Dr. Braithwaite, as well as compared with an authentic example gathered by Dr. Schimper in the Salzburg Alps, in the herbarium of the late Dr. Spruce. It is the *Desmatodon cernuus* of Bruch & Schimper, Bryol. Eur. ii. t. 134, and of Schimper's Synops. ed. ii. p. 186, and *Trichostomum inclinatum* of Mueller's Synopsis, i. p. 593.—C. P. Hobkirk.

Mosses of North-east Yorkshire, "V.-C. 62" (Journ. Bot. 1900, 484–9).—"V.-C. 62," as defined by Watson, is bounded on the south by the political boundary between the North and East Ridings, and on the west by the Rivers Ouse and Wiskett. In Mr. Ingham's list several localities are given which are in v.-c. 64 (Mid-west Yorks)—*e. g.* Askham Bog, Appleton Roebuck, Thorp Arch, Boston Spa, and Bolton Percy; while Leckby Carr, which is also mentioned, is in v.-c. 65 (North-west Yorks). The district has been closely worked by such excellent bryologists as Spruce, Slater, R. Barnes, and G. Webster, and records of their work are easy of access. Mr. Ingham's list would have been valuable had he made it as far as possible exhaustive by embodying in it all these earlier records. As it is, its utility is not very evident; in fact, it may even be misleading. The second edition of Mr. J. G. Baker's *North Yorkshire*, now in course of publication, will contain a list of the mosses and hepatics of the North Riding, with localities revised and brought up to the present year by Mr. Matthew B. Slater.—Llewellyn J. Cocks.

Acorus in Cheshire.—A specimen from Richardson (not that mentioned by Mr. Spencer Moore in Journ. Bot. 1899, 76) in Petiver's Hort. Sicc. Angl. (Herb. Sloane, 152, fol. 177) gives an earlier date for his finding of *Acorus* than is given in the *Flora of Cheshire*. Richardson's MS. note runs:—"This was gathered in an old moate at Holford, in Cheshire, where it grows in abundance; and alsoe in some marle-pits called Holford pitts, about six miles from Northwich. I could have gathered 1100 in these places about the beginning of July 1711. R. Richardson."—James Britten.

NOTICES OF BOOKS.

Catalogue of the African Plants collected by Dr. Friedrich Welwitsch in 1853–61. Part III.—Dipsaceæ to Scrophulariaceæ (1899). Part IV.—Lentibulariaceæ to Ceratophylleæ (1900). By William Philip Hiern, M.A., F.L.S. British Museum (Natural History): Dulau & Co.

Mr. Hiern is to be congratulated on the completion of his part —the Dicotyledons—of the Welwitsch Catalogue. The Monocotyledons were published by Dr. Rendle in 1899—we regret that Dr. Schinz's other occupations have prevented him from preparing the notice of that part of the work which he had promised to contribute to these pages; and the volume devoted to Cryptogams is passing through the press. In the course of next year, therefore, we may expect the completion of this lasting memorial to one of Africa's most eminent botanical explorers.

In our notice of the first part of the Catalogue (Journ. Bot. 1897, 23–26) we indicated sufficiently the plan of the work, and paid tribute to the care and labour which Mr. Hiern had bestowed upon it. Although many of Welwitsch's novelties have been described in monographs, floras, and occasional publications, there yet remained a considerable number to reward Mr. Hiern's investigations. Thus in part iii. we have one new genus (*Velvitsia* in *Scrophulariaceæ*— a very striking plant) and 127 new species, nearly half of them *Compositæ;* and in part iv. a new genus, *Symplostemon* of Welwitsch's MSS.—a Labiate earlier referred by Mr. C. H. Wright to *Plectranthus*—and eighty-nine new species. The Composite genus *Adenogonum*, published from Welwitsch's MSS. in this Journal for 1898 (p. 290, t. 389) as new, had been already cited by Oliver (Ic. Pl. t. 2205) as a synonym of *Engleria;* and Mr. Hiern accepts this reduction, although he does not follow Oliver in regarding Welwitsch's plant as a variety of *E. africana*, but describes it as a new species—*E. decumbens.*

We note that M. Hallier is followed in the limitation of the genera of *Convolvulaceæ*, and also mainly (perhaps somewhat too absolutely) as to species. *Urticaceæ* is divided, in accordance with Engler and Prantl, into three orders—*Moraceæ* and *Ulmaceæ* being separated from the aggregate group. There is a good deal of work in *Amaranthaceæ*, where we find Adanson's name for *Ærva*, adopted by Dr. Kuntze in the modified form *Uretia*, stands in its original ugliness as *Ouret*, just as his *Pupal* replaces the more euphonious *Pupalia* of Jussieu; *Pandiaka Heudelotii*, cited by Jackson as of Benth. & Hook. f., is here given more correctly as of "Jacks. Ind. Kew.," where the generic and specific names are first definitely combined.

When noticing the last part of the *Flora of Tropical Africa* (pp. 279–281), we referred to the unfortunate absence of correlation between Mr. Hiern's work and that proceeding at the same time at Kew on the same groups of plants, and the consequent and unnecessary increase of synonymy. We are glad to know that those responsible for the neglect have taken steps which will avoid a recurrence of the inconvenience; and to see that only one of Mr. Hiern's new species has been forestalled—*Vitex huillensis*, which is antedated by *V. grisea* Baker. We fear, however, that the forthcoming part of the *Flora of Tropical Africa* will exhibit a more serious conflict, as we understand that some sheets were printed off before the publication of Mr. Hiern's last part, which of course will take priority. In one or two cases we note a difference of opinion as to genera—thus *Premna colorata* of Hiern is identical with *Vitex sulphurea* of Baker: we presume that, should the position assigned to the plant by Mr. Hiern be maintained, those who insist on the retention of the earliest trivial name will form a third combination.

In matter of nomenclature Mr. Hiern continues to follow on the lines laid down by Dr. Kuntze, exercising, however, independent judgment and investigation. We note that he is able to rehabilitate the genus *Ethulia*, which had been set aside in favour of *Pirarda*, the former genus dating, not from Linn. "gen." [Sp. Pl.] ii. (July, 1763), as stated by Dr. Kuntze, but from "L. f. Decas i. p. 1, t. i. (1762)." *Pattara* (Adanson, 1763) for *Embelia* (Burm. f., 1768) and *Parasia* Rafinesque (1836) for *Belmontia* (E. Meyer, 1837) are instances in which Mr. Hiern has anticipated Dr. Kuntze in restoration; and we note that he adopts *Siphonanthus* in preference to *Clerodendron*, as, although both are in ed. i. of the *Species Plantarum*, the former appears in the earlier portion, published in May, 1753, and the latter in the second part which appeared in August of the same year. We note that Mr. Hiern retains the name *Wedelia* for the well-known genus of *Compositæ;* that name, however, which was first employed by Loefling, must, we think, replace *Allionia* of Linnæus, and *Niebuhria* Necker will supersede the *Wedelia* of Jacquin and most authors.

We are glad to see that Mr. Hiern associates the name of Mr. Carruthers with one of Welwitsch's plants—*Urticastrum Carruthersianum:* "it was through his representations, when Keeper of the National Herbarium, that the Trustees of the British Museum undertook the publication of this Catalogue."

Veitch's Manual of the Coniferæ. A new and greatly enlarged edition, by Adolphus H. Kent. 8vo, pp. 562, with numerous plates, and 141 figs. in the text. James Veitch & Sons: Chelsea. 1900.

Veitch's *Manual of the Coniferæ* has long been recognized as a standard work on Conifers; and in bringing out a new and revised edition the publishers have increased the obligation due to them from the botanist, as well as by the student of horticulture and forestry. Mr. Kent has done excellent service in connection with the *Manual of Orchidaceous Plants*, for the subject-matter of which he was largely responsible; and we have no hesitation in saying that, except Dr. Masters, there is no one so well fitted to approach the subject of a handbook on Conifers. It is possible to prepare monographs of some families without going beyond the walls of a herbarium, but such a method of procedure in the case of the *Coniferæ* would be disastrous. The family is one which must be studied while living and growing, under various conditions and in different stages of development. Mr. Kent has had exceptional opportunities for such studies, and hence his peculiar fitness for the task he has now undertaken.

The plan of the book is as in the former edition. The "General Review" has grown to over a hundred pages, and forms an excellent introduction to the general morphology and distribution of the family, both in space and time. Here, as elsewhere, the author acknowledges his indebtedness to Dr. Masters's recent invaluable contributions to our knowledge of the order, chiefly through the medium of the Linnean Society's *Journal*. This part of the book has also been augmented by the inclusion of the papers on the "Diseases of Conifers," by Prof. Marshall Ward, and "Insects injurious to *Coniferæ*," by Mr. W. F. H. Blandford, which have been reprinted or abridged from the Report of the Conifer Conference held at Chiswick in 1891, under the auspices of the Royal Horticultural Society.

In the systematic portion of the work Mr. Kent has followed the arrangement adopted by Dr. Masters. The *Taxaceæ* are considered to represent a group of ordinal rank as originally proposed by Lindley, a position which accords better with the marked structural peculiarities of the flower and fruit than the tribal rank subsequently reverted to and maintained, among other botanists, by the authors of our *Genera Plantarum*, and also by Eichler, whose arrangement appeared in 1887 in the *Natürlichen Pflanzenfamilien* of Engler and Prantl.

The genera admitted in the *Manual* are those of Dr. Masters's recent revision, with the exception of Endlicher's *Glyptostrobus*, which is included in *Taxodium*, and of *Abietia*, a new name coined by Mr. Kent to replace *Pseudotsuga* of Carrière, with which he also includes *Keteleeria* of the same author. The name *Pseudotsuga* is rejected because it is a barbarous combination, and "misleading in such meaning as it has;" but we do not think many botanists will be inclined to follow Mr. Kent. The reformers of nomenclature have sufficient scope already, without extending their licence to barbarous names.

Good descriptions are given of all genera, species, and varieties which are likely to be of the slightest value from an economic or horticultural point of view; wherever it was possible, the descriptions have been made from fresh specimens. To extensive notes on geographical distribution, habitat, and economic use, Mr. Kent adds information as to the introduction and growth of the plant in this country. He has also given short biographies of those botanists, collectors, &c., who have been commemorated in specific names.

The plates and figures, many of them new, are of a high order, and add much to the attractiveness and usefulness of the work, the whole get-up of which is excellent. The author has not only been eminently successful in his endeavour "to collect from the best available sources every item of information that should prove useful and interesting to amateurs of this remarkable family of trees and shrubs, and also to foresters and horticulturists"; he has also made a valuable addition to the literature of botany.

A. B. Rendle.

Cyclopædia of American Horticulture. By L. H. Bailey, assisted by Wilhelm Miller and many Expert Cultivators and Botanists. Illustrated with over 2000 original engravings. Vol. i. A–D; vol. ii. E–M. 4to, pp. xxii, 510, xiv, 511–1054. Price one guinea each. Macmillan & Co.: London and New York. 1900.

The "1900" Supplement to the Dictionary of Gardening. By George Nicholson, F.L.S., etc. A–F. 4to, pp. vi, 376. Price 10s. 6d. L. Upcott Gill: London.

The American analogue of Mr. Nicholson's *Dictionary of Gardening* is a far more important work, from a botanical point of view, than its prototype. Whether it is as useful to gardeners, we are not in a position to state; it is certainly more comprehensive, for, besides articles dealing with cultivation and revisions of genera, it contains brief biographies of American worthies and descriptions of such things as aquaria, which would hardly seem to come within the scope of a work on horticulture. So far as externals go, its good and bad qualities are about equally balanced. Thus, the cover is artistic, contrasting very favourably with the ugly envelope affected by Mr. Nicholson's publishers; but the binding up is so badly done, that the volumes come to pieces almost at a glance. It is very well printed, but on such outrageously heavy paper that only a strong man could carry the four volumes any distance. The illustrations are not of the miscellaneous seedsman's-catalogue order employed in the *Dictionary of Gardening*—those in the *Supplement* are better; but they are for the most part scratchy and inadequate: the absence of most of those (excluding the portraits) to which a whole page is devoted would be a positive gain to the book.

The contents, however, are less open to criticism, as would be anticipated from the fact that Prof. L. H. Bailey is responsible for them. Breadth and sanity of view, thoroughness of treatment, and a literary style which avoids dryness but never degenerates into gush—these are qualities which we expect to find in his writings, and we are never disappointed. In certain details of arrangement, the American work is in advance of the English; for example, the species under each genus, which in Mr. Nicholson's book are arranged alphabetically, are here grouped under a more scientific system, according to their affinities, a clavis being sometimes prefixed. The alphabetical plan is of course in some respects more convenient—we have even heard it suggested that herbaria should be arranged throughout by the letters of the alphabet!—but the scientific arrangement is manifestly far more instructive, and in the long run more useful.

In view of the fact that certain of these articles will have to be taken account of from a botanical and nomenclatural standpoint, it is satisfactory to note that each of them is signed. Prof. Bailey has indeed been fortunate in obtaining so many collaborators; the list of these in his first volume includes 170 names, and others appear in the second.

On turning over the pages, we observe two or three references which show that the biographical notes would be the better for a little revision. It is odd, for instance, to find the date of John Bellenden Ker's death, which took place in 1842, given as 1871 (vol. i. p. xx); Banks was something more than a "famous English scientist" (whatever that may mean); and Cattley was hardly what we should understand by "an early English naturalist." It would also be well if the dates of birth and death were uniformly added, instead of only exceptionally, as at present. There is a certain grim humour in the account of a great American grape-grower: "Ephraim W. Bull was loved of his neighbours and honored by every countryman who grows or eats a grape. He made very little money from his variety, and died in extreme poverty."

The *Dictionary of Gardening* has become a standard book of reference; it has been adapted into French, and a French Horticultural Society has awarded the French editor a prize of £100. Mr. Nicholson probably thinks this is one of the things they do better in France. "Nearly twenty years have passed," the publisher tells us, in a curiously-worded preface, since it "first saw the light"; but by this he means the first number, for the preface to the last volume is dated December, 1888. Anyway it was quite time that a supplement should be issued, and here we have the first volume of it—or rather the first instalment, for there is to be but one "supplemental volume"—which is of course indispensable to possessors of the original. It possesses all the defects as well as the advantages of the earlier volumes—*e. g.* the bewildering abbreviations of works cited, and the uniform and useless page-headings. The figures are less miscellaneous and more pleasing: a number of names appear on the ugly title-page as joint authors. The bulk of the book would have been lessened, and its usefulness not diminished, if a large number of the "English names" had been omitted: some of these, such as "Bastard Clover" for *Trifolium hybridum*, are mere translations; others, like "Bastard Cress" for *Thlaspi*, are never used; "Branching Annual Stock," again, is assuredly *not* "a common name for *Malcolmia maritima*," which is always known as Virginia Stock. But, as we have said, the *Supplement* is indispensable to all possessors of the *Dictionary*, to which it forms a worthy companion.

LEGRÉ (Ludovic). *La Botanique en Provence au XVIe siècle. Leonard Rauwolff; Jacques Raynaudet.* Marseilles: Aubertin et Rolle. 1900. Pp. x, 149.

M. LEGRÉ continues to increase the indebtedness of the botanic world to him by his rapid issue of researches on the early workers in botany in the south of France. We have already in this Journal (1899, pp. 38–92, 283) referred in terms of high praise to his previous performances, and this publication is quite equal to its predecessors.

The name of Rauwolff is perhaps best known as the author of some quaintly written travels in the sixteenth century; but he has a further claim on our interest by the fact of his collection of dried plants being still in existence, and well-preserved, in the University of Leyden.

The author had the good fortune to secure the help of the French Government in his researches, and received a letter from the Minister for Foreign Affairs to the French representative at the Hague, and the French consuls throughout the Netherlands. In consequence of this potent aid, M. Legré was enabled to pursue his search to the best advantage, and a subvention to the Academy of Science at Marseilles has permitted of the issue of this work in its present form.

Rauwolff was born at Augsburg between 1535 and 1540: the first certain date being that of his matriculation at Montpellier, 22 November, 1560. He began to study the plants round that city as soon as he settled there, where he remained till 1562; the year after that he was in Italy, then, passing by the St. Gothard, he came back to Germany by Switzerland.

In the year of his return to his native town he made the acquaintance of Clusius, and in 1565 he married. After five years' absence, he came back to Augsburg as municipal doctor of medicine. His brother-in-law, Melchior Mannlich, was settled at Marseilles as a wholesale dealer in drugs and spices; he induced Rauwolff to undertake a journey to Syria to discover the source of certain drugs, offering not only to defray the cost of the voyage, but a salary also.

Rauwolff consented, and set out first for Marseilles, thence sailing on 2nd September on board the 'Santa Croce.' After nearly three years of absence, he came back in safety to his own city, where he resumed his interrupted duties, becoming the doctor of the hospital for plague patients. In 1588 he was deprived of his place in consequence of his adherence to the Protestant faith; he left Germany for Austria, became surgeon to the army, and died at Hatvan, in Hungary, in 1596. Such in brief is the story of his life, of which fuller details may be found in M. Legré's pages.

The collection of plants which he formed now consists of four volumes, and these have been carefully gone over by the author, who gives lists of the contents; the names in some cases have been altered by Clusius, and by an unknown hand.

The name of Raynaudet may be found more than once in the *Adversaria* of Pena and Lobel: he was an apothecary of Marseilles, and the three months which were there spent by Rauwolff, when waiting to sail, were profitably employed in botanizing with Raynaudet in his garden or in the neighbourhood of Marseilles. Dates seem to be wholly wanting as regards this early worker, but what little can be discovered has been laboriously pieced together by the author in less than thirty pages. The only thing which appears certain is, that he must have died at an early age.

This volume has been drawn up with the accustomed care of the writer, and is therefore a valuable addition to our knowledge of the men of that interesting time, when, in the sixteenth century, botany was developing in the south of France.

B. Daydon Jackson.

ARTICLES IN JOURNALS.[*]

Bot. Centralblatt (No. 49). — F. W. Neger, 'Kritische Bemerkungen zu einigen Pflanzen der chilenischen Flora.'—(Nos. 49–51). L. Cador, 'Anatomische Versuchung der Mateblätter' (concl.). — (No. 50). H. Lindberg, 'Some species of *Polytrichum*' (1 pl.).—(No. 52). F. Quelle, 'Zur Kenntniss der Moosflora des Harzes.'

Bot. Gazette (15 Nov.).—B. E. Livingston, 'Change of form in Green Algæ' (2 pl.). — C. MacMillan, 'Observations in *Lessonia*' (3 pl.). — C. D. Beadle, 'Studies in *Cratægus*.' — J. F. Corell, 'David Fisher Day' (1829–1900; portr.). — C. E. Preston, 'Root system of *Cactaceæ*.'

Bot. Notiser (häft. 6; 15 Dec.).—J. I. Lindroth, 'Mykologische Notizen.'—B. Kaalaas, *Trichostomum arcticum*, sp. n.—K. Johannson, 'Några bidrag till Dalarnes flora.' — B. F. Cöster, 'Några weddelanden om hybrider af släktet *Epilobium*.' — O. Nordstedt, 'Om Sandhems flora' (concl.).

Gardeners' Chronicle (24 Nov.). — F. Kränzlin, *Stanhopea stenochila* Lehm. & Kränzl., sp. n.—J. Hoog, *Iris urmiensis* (fig. 116).—(1 Dec.). H. N. Ridley, *Habenaria columbæ*, sp. n.). — (8 Dec.). C. T. Druery, 'Pollen Grains' (figs. 126–129).

Journal de Botanique ("Juin"; received 14 Dec.). — G. Fron, *Euphorbia Intisy*.—A. De Coincy, *Echium maritimum*.—F. Guégnen, 'Sur le tissu collecteur et conducteur des phanérogames' (cont.).—P. Hariot, *Ligustrum Delavayanum*, sp. n. — E. Bonnet, 'Quel est l'inventeur des exsiccata?' — C. Bernard, 'Recherches sur les sphères attractives chez *Lilium candidum*, etc.' (cont.).

Oesterr. Bot. Zeitschrift (Dec.).—E. Lampa, 'Über einige Blattformen der Liliaceen' (1 pl.). — J. Freyn, 'Flora von Steiermark' (concl.).—P. Magnus, *Urophlyctis Kriegeriana*.

---

[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

BOOK-NOTES, NEWS, &c.

MESSRS. DENT's little volume entitled *Plant Life and Structure* (price 1s. net) is one of the "Temple Cyclopædic Primers," "a series of volumes of condensed information introductory to great subjects, written by leading authorities, both in England and abroad, adapted at once to the needs of the general public, and forming introductions to the special studies of scholars and students." The book, which is a translation from the German of Dr. E. Dennert by Clara L. Skeat, is a neat little work in small 8vo, with 116 pages and fifty-six figures. It is fairly accurate, but it is not easy to understand to what class of reader it will prove useful. The information is certainly condensed, far too condensed for the general public; and, as regards the more serious student, there are several inexpensive books which will give a practical working introduction to the science, such as cannot possibly be acquired from this little primer.

AT the meeting of the Linnean Society held on Nov. 15th, 1900, Mr. W. B. Hemsley exhibited a number of specimens and drawings of *Fitchia*, including a new species from the island of Raratonga, in the Cook Archipelago, discovered by Mr. T. F. Cheeseman. The genus was described from specimens thought to have been procured on Elizabeth Island, a remote coral island in the Eastern Pacific; but Mr. Hemsley gave reasons for believing that the locality of the plant described by Sir Joseph Hooker was Tubnai Island, in the same latitude, but 20° further to the west: an island of volcanic origin and mountainous, and theretore more likely than a coral island to be the habitat of such a plant, especially as it was originally discovered by Banks and Solander in Tahiti. Only three or four species are known: they are small resiniferous shrubs of tree-like habit, with rather thick branches, opposite simple leaves borne on slender stalks, and terminal, usually solitary flower-heads. The systematic position of *Fitchia* is not very evident; although usually placed in the *Cichoriaceæ*, Mr. Hemsley considered its affinities as a resiniferous plant to be with the *Helianthoideæ*, and near to *Petrobium*. After discussing the views of systematists on this point, he briefly described the new species from Raratonga (*Fitchia nutans*), remarking that it secreted a resin which is exuded on the young branches and flower-heads, and is used to prepare an agreeably odoriferous oil.

AT the same meeting Mr. W. C. Worsdell read a paper entitled "Further Observations on the *Cycadaceæ*," intended to throw additional light on the problem as to the phylogenetic origin and relationships of this group of plants. By some authorities these have been considered as allied to the Conifers, while in appearance they resemble palms and ferns. They are now confined to the warmer regions of the globe, though they were formerly widely distributed. The group was at its maximum in Jurassic and Triassic times; and Cycad remains, especially in the Lias and the Oolite, are familiar to palæontologists in this country. This paper, like the rest of the author's work on this group, had two main objects—to contribute to the clear and precise knowledge of the vegetative structure, and to point out, by means of that knowledge the relationship of the Cycads to, and their descent from, fern-like plants.

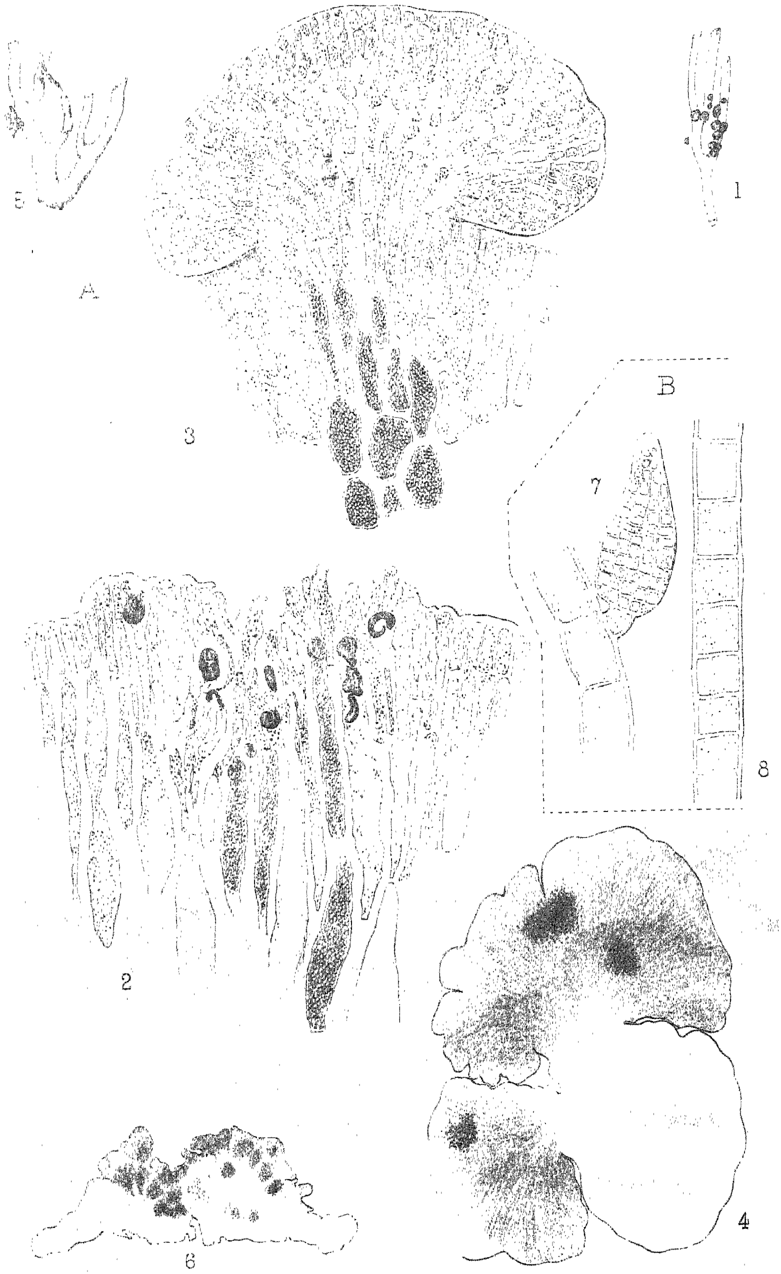
At the meeting of the same Society held on Dec. 6th, Dr. Rendle exhibited specimens of *Zostera marina* from Tibet and of *Halophila stipulacea* from Tuticorin, and made observations which we hope to publish later. Mr. H. Groves communicated a paper by Mr. G. C. Druce, entitled "A Revision of the British Thrifts" (*Statice* and *Armeria*), in which he attempted a rectification of the synonymy, and discussed the value of the pubescence on the ribs of the calyx as a distinguishing character.

The culture of Citrus trees in Australia is increasing year by year, and the Australian Department of Agriculture has published a little volume by Mr. D. McAlpine—*Fungus Diseases of Citrus Trees in Australia*—in which is given an exhaustive account of all the fungi that have been recorded on Citrus in the colony. He has found twenty-five species of fungi on the Orange, and thirty-one on the Lemon, besides eighteen common to both; three species on the Citron, two on the Shaddock, and three which are parasitic on the scale-insects that infest Citrus trees. This formidable list might lead one to infer that these trees were peculiarly liable to attack from fungi; but, fortunately, they are not all parasitic. Many of them, such as *Penicillium glaucum*, the familiar blue-mould, *Cladosporium herbarum*, and others, make their appearance after decay has set in, and grow on dead Citrus as on any other vegetable matter. The first part of the book, the most important section, deals with the fungi that are directly injurious to the growing plant. The second part is occupied by a description of fungi that are less harmful, or less frequent, grouped as they occur on fruit, leaf, stem, or root. Many of them are confined to Australia alone: as the fruit trees were originally imported from Europe, this seems rather remarkable; but it is to be remembered that the native Citrus is used as stock in the colonies, and thus native diseases have probably persisted on the grafted plants. The harmful parasites are all minute species, and occur mostly on the leaves and fruit. One species—*Phoma omnivora*—attacks the roots, causing root-rot. The book is well illustrated by twelve coloured plates of the diseases most frequently met with, and 186 figures of the fungi causing them; the numerous new species are fully described, and each is furnished with an "English name," of which "Federation Dothiorella," "Scabbing Ramularia," and "Corrugating Cladosporium," may be taken as types. "Citrus Sphærella" is not, as might be supposed, a new species of *Citrus*, but the "English" equivalent of *Sphærella citricola!* Full and careful practical instructions are given as to the treatment that has been found most efficacious in remedying or checking the pest.

Just as we go to press, and too late for notice, appears the completion of vol. vii. of the *Flora of Tropical Africa*, bringing the enumeration down to *Plantagineæ*. Sir W. Thiselton-Dyer contributes a brief preface, in the course of which he thus explains the delays which have hindered the progress of the work:—"The present volume was ready for the press at the beginning of 1898. The inconvenience of the delay in publication is obvious. The contributors see other writers secure the priority of their work, while the manuscript has continually to be re-written to incorporate what has been published while it is waiting for the printer. For all this I am in no way responsible. I prepare the work; but over printing and publication I have not the slightest control. And as no less than five government departments have a say in the matter, the task of getting them into line is one of no small difficulty. A fire which took place at the printer's in December of last year was a further impediment. Fortunately, however, most of the manuscript was recovered eventually from the ruins. Three more volumes will complete the work as originally planned. Their preparation presents no inherent difficulty, but their fate lies on the lap of the gods."

THIS explanation of course only refers to the delays in the publication of the present volume. The "inconvenience" mentioned, however, applies with still greater force to the thirty-one years during which the work remained in abeyance, for the greater part of which—*i. e.* since 1872—it was in the hands of the present editor, who issued the first instalment of the continuation in 1896. As a result of this delay, the work has indeed had to be "re-written"; but the responsibility for this can hardly be laid at the door of the printer. Mr. Hiern, for example, at the request of Mr. Dyer (now Sir W. T. Thiselton-Dyer), prepared the *Scrophularineæ* in 1874–5, and is now, after an interval of twenty-five years, re-writing them. It will of course be noticed that the editor only claims the "preparation" as his share of the work, and in this he acknowledges the help of his staff; he has not so far contributed to the scientific contents of the volumes.

THE appearance of "Appendix I. 1901" of the *Kew Bulletin*, which, in spite of its thrice-repeated date, was actually issued in November last, suggests wonder whether the printers—in this case H. M. Stationery Office—are in this case responsible for the delay in publication. One would imagine that its "preparation" could "present no inherent difficulty," but no number has appeared since October, 1899, although, as we pointed out last month (p. 501), the volume for 1900 has been cited. The delay is the more inexplicable in that, when the existence of the *Bulletin* was threatened in 1892, the *Times* proclaimed that its publication was "one of the most useful functions" discharged by Kew Gardens. It will be remembered also that the *Bulletin* replaced the annual reports of the work of the Gardens which used to be issued, and which contained much matter of botanical interest. The Guide to the Gardens, which was stated in the House of Commons in 1891 to be "almost ready," has never appeared. Is this, as well as the *Bulletin* and the Cape African Floras, "on the lap of the gods," or are the printers once more responsible?



E. S. Barton del.
R. Morgan lith.

West, Newman imp.

A Galls in Furcellaria and Chondrus.

ON CERTAIN GALLS IN FURCELLARIA AND CHONDRUS.

By Ethel S. Barton.

(Plate 418, figs. 1–6.)

The subject of gall-formation in algæ, as the result of attack by animals, has never received much attention, though the interest of such a study should attract both zoologists and botanists. Up to the present the only instances recorded are those on *Vaucheria* caused by a rotifer*; on *Rhodymenia palmata* Grev.† and *Desmarestia aculeata* Lam.‡ by a copepod; and on *Ascophyllum nodosum* Le Jol.‡ by a nematode worm. It may be remembered that the nematode of *Ascophyllum* was not only new to science, but was the first and hitherto the only recorded marine species. In this paper two more instances are described in which algæ produce galls, as the result of attack by nematodes.

In May of this year it was observed that a considerable number of plants of *Furcellaria fastigiata*, thrown up on the shore at Lyme Regis, showed irregular swellings along the thallus, and on investigation these swellings proved to be galls inhabited by nematodes. Somewhat similar outgrowths were also observed on *Chondrus crispus*, though very sparingly. Specimens of these algæ have been sent to Dr. de Man for determination of the nematode, and he reports that in neither alga does he find the *Tylenchus fucicola* which inhabits *Ascophyllum*. It is difficult to say as yet whether the nematodes found in *Furcellaria* and *Chondrus* are identical species, but in any case they belong to a genus other than *Tylenchus*. A description of them will be published later by Dr. de Man.

The *Furcellaria* galls were present in so much greater abundance than those on *Chondrus*, that it was possible to work them out more satisfactorily. The general development of the outgrowth in *Furcellaria* is much the same as that in *Ascophyllum*. In the youngest stages observed, the peripheral cells and the layer immediately below these are disturbed and forced asunder by the entrance of the nematode, which is found sometimes near the opening, sometimes as deep down as the centre of the thallus. The peripheral cells of the thallus round the point of entrance begin to divide transversely, parallel to the surface, and grow out above the level of the surrounding cells; thus forming a small excrescence, the first beginning of the gall. At this stage certain of the cells situated below the excrescence are to be found closely packed with rather large granules, to be described later. The gall continues to grow by subdivision of its outermost cells, while the long narrow cells, present in the normal thallus just below the superficial layer, become considerably elongated. The superficial position of the gall, together with the long narrow form of these cells, suggests at first sight a parasitic alga with penetrating filaments. The cells of the gall exhibit walls of considerable thickness, together with dense granular contents. In the largest galls the tissue is to a certain extent destroyed by the nematodes which are present among the cells. The fact that the young gall remains intact may be explained by a rapid growth taking place while the animal is still buried in the main thallus. In order to escape, the nematode would afterwards have to force its way through the close structure of the mature gall, thereby tearing it apart. The galls sometimes arise close together, and as each one equals or exceeds in size the diameter of the main thallus, a group of them forms a conspicuous, irregular knob.

---

* Vaucher, *Conferves d'eau douce*, t. iii. fig. 8 (1803).

† E. S. Barton, "On the Occurrence of Galls in *Rhodymenia palmata* Grev.," Journ. Bot. 1891, 65, t. 303.

‡ E. S. Barton, "On Malformations of *Ascophyllum* and *Desmarestia*," in *Phycological Memoirs*, p. 21, t. vii. April, 1892.

The granules referred to above as occurring in the cells below and around the growing gall differ very much both in size and form from those of the ordinary thallus-cells. Their form is oval or round, and their diameter from 4 μ to 7 μ. They are of a clear and slightly refractive nature, having the appearance of small starch-grains, but showing no concentric structure. In polarized light they show the well-known black cross characteristic of starch-grains. Under the action of acids and alkalies they swell up, and soon dissolve completely; with iodine they take on a brown tint slightly deeper than that of the surrounding cell-contents, but after heating in water to 100° C. for a short time (presumably after hydrolysis of the substance of the granule) application of iodine produces a bluish-purple tint.

Since these structures agree in all respects, except for the presence of concentric layers, there can be little doubt that they are identical with the granules described by Prof. Van Tieghem as Floridean starch.* They probably consist chiefly of amylodextrin.† It is interesting that structures which occur in the normal cells of *Florideæ* should be found in *Furcellaria* only in those cells which have been stimulated by the action of the nematodes.

Among the slides in the Schmitz collection at the British Museum are three of *Furcellaria fastigiata*, labelled "Knöllchen-Johnson." The sections are very deeply stained and rather imperfect, but, so far as can be seen, the galls appear to be the same as those I have described, though I can detect no actual nematode.

The material of *Chondrus crispus*, which showed galls as the result of attack by nematodes, was so scarce that it has not been possible to make a full examination of them. So far as can be seen, a similar process takes place, but whether the same peculiar cell-contents are found in the young stages I do not know, as none but mature galls were at my disposal. In one case the cystocarp had been attacked, but in another specimen the galls arose from the vegetative part of the thallus, as in *Furcellaria*. If sections across thallus and gall are stained with aniline blue, the colour is only taken up deeply by the uninjured parts of the thallus, and the diseased portions containing the colonies of nematodes remain much lighter in colour.

---

* Van Tieghem, "Sur les globules amylacés des Floridées et des Corallinées," *Comptes Rendus*, xi. 804 (1865).

† Arthur Meyer in *Botanische Zeitung*, 1886, pp. 697, 713.

Finally, I offer my best thanks to Mr. V. H. Blackman, to whom I owe the observations on the starch-like granules.

SPORANGIA OF ECTOCARPUS BREVIARTICULATUS.

By Ethel S. Barton.

(Plate 418, figs. 7, 8.)

During an investigation of some material of *Chnoospora atlantica* J. Ag., collected at St. Vincent, West Indies, by Mr. W. R. Elliott, I was led to examine the tufts of *Ectocarpus breviarticulatus* growing on it. This proved to be in fruit, and, as the sporangia have never been described for this species, it may be of interest to do so now.

The sporangia in question are plurilocular, and occur sparingly; they are of an ovate form, with the upper end more or less pointed, and vary from 20–35 μ in breadth and 60–90 μ in length. They arise generally from a short pedicel cell, but occur also sessile, and even sometimes as the termination of a short two-celled branch.

In Prof. Agardh's original description of *E. breviarticulatus* (Nya alger från Mexico, Kongl. Vet.-Akad. 1847, p. 7), the cells of the primary creeping filaments are said to be shorter than their diameter, while the cells of the secondary filaments are 1½ times as long as their breadth. This, however, is not a constant characteristic in the St. Vincent material: in some cases longer cells appear in the primary filament, and very often short cells are found in the superior filaments. Some of the latter are figured here.

Explanation of Plate 418. — Fig. 1. *Furcellaria fastigiata* Lam. with galls, nat. size. 2. Ditto, thallus, showing early stage of gall, × 260. 3. Ditto, later stage of gall, × 130. 4. Ditto, mature galls, × 25. 5. *Chondrus crispus* Stackh. with galls, nat. size. 6. Ditto, transverse section of mature galls and thallus, × 6. 7. *Ectocarpus breviarticulatus* J. Ag., plurilocular sporangium, × 375. 8. Ditto, some cells in an upper filament.

PEMBROKESHIRE PLANTS.

By W. R. Linton, M.A.

The following plants were noticed during a fortnight in September, spent principally at St. David's, but including a few hours at Haverfordwest and a day at Tenby. Those new for the county have an asterisk prefixed. I am indebted to Mr. A. Bennett for kindly corroborating the new records; to the Rev. W. Moyle Rogers for correcting or corroborating the *Rubi;* to Mr. F. Townsend for the same with the *Euphrasiæ;* and to Mr. J. Groves for help with the *Charæ.*

Ranunculus trichophyllus Chaix. Treleddyd Fawr Common.—*R. hederaceus* L. St. David's. — *R. Flammula* var. *radicans* Nolte. Frequent on wet commons, as Waun Fawr, Pwll Trefeithan, &c.—*Aquilegia vulgaris* L. Haverfordwest.

Fumaria confusa Jord. On earthy wall-tops near Dowrog Common, and in a field by Pen Berry.

Cochlearia danica L. Porth Clais; Tenby.—*Brassica oleracea* L. Tenby.—*B. Sinapioides* Roth. Solva; Haverfordwest. — *Diplotaxis tenuifolia* DC. Haverfordwest. — *Lepidium hirtum* Sm. Frequent about St. David's.—*Raphanus maritimus* Sm. Tenby.

**Reseda lutea* L. Dowrog; fields by Pen Berry. — *R. Luteola L.* Solva.

Viola Riviniana var. *nemorosa* Neum., W. & M. Pwll Trefeithan; Treleddyd Fawr Moor.—*V. ericetorum* Schrader. Pwll Trefeithan; Tenby. — **V. lactea* Sm. Waun Fawr; Pwll Trefeithan. — **V. Curtisii* Forst. Traeth Mawr.

**Polygala serpyllacea* Weihe. The Burrows; Treleddyd Fawr Moor.—*P. vulgaris* L. Tenby.

Saponaria officinalis L. In several places. Wall-tops near Dowrog; on the cliffs near the lifeboat station. — *Sagina maritima* Don. Solva.—*S. apetala* L. Frequent on walls about St. David's. **S. ciliata* Fr. St. David's, on walls.—*S. nodosa* Fenzl. Frequent on commons.—*Buda rupestris* Dum. Coast rocks, Caer Bwdy, &c.

Hypericum perforatum L.; *H. quadratum* Stokes. Frequent.—**H. undulatum* Schousb. Caer Bwdy, and other places on banks by the sea; probably also on boggy commons about St. David's, but I at first passed it over, until the red look of the petals attracted my attention.—*H. pulchrum* L. Frequent.—*H. elodes* L. Wet places on cliffs, St. David's.

Malva sylvestris L. St. David's.

Radiola linoides Roth. Frequent on commons.—*Linum angustifolium* Huds. In several places. Roadside, Dowrog; Treleddyd Fawr Moor; Porth Clais.

Geranium columbinum L. Solva. — *Erodium cicutarium* L. White-flowered, on walls, St. David's. — *E. moschatum* L'Hérit. Solva.—*E. maritimum* L'Hérit. Solva; Porth Sele.

Ulex Gallii Planch. Frequent. — *Ononis repens* L. Walls and fields. — *Trifolium scabrum* L. Traeth Mawr. — *T. fragiferum* L. Pont Pen Arthur, and other places. — *T. procumbens* L. Frequent, rather taking the place of _T. minus._ — _Anthyllis Vulneraria_ L. Frequent.—*_Vicia angustifolia_ Roth. Roadside between St. David's and Whitchurch.

*_Prunus insititia_ Huds. Here and there in hedges, St. David's. —_P. Cerasus_ L. Between St. David's and Whitchurch. — _Rubus affinis_ W. & N. Treleddyd Fawr Common.—*_R. affinis_ var. _Briggsianus_ Rogers. Waun Fawr; Dowrog Common; Treleddyd Fawr Common; Clegyr Foia. "I have seen a specimen of _Briggsianus_ from Fishguard, Pembroke, in C. C. Babington's _lentiginosus_ packet in the Cambridge hb.," _W. M. R. in litt._—*_R. cariensis_ Rip. & Genev. Porth Clais. — *_R. pulcherrimus_ Neum. Frequent. — _R. rusticanus_ Merc. Frequent. — _R. Schlechtendalii._ Porth Clais. — _R. leucostachys_ Schleich. Frequent. — *_R. Borreri_ Bell Salt. Treleddyd Fawr Common. — *_R. dumetorum_ var. _ferox_ Weihe. About St. David's; Porth Liska, &c. — _R. cæsius_ L. St. David's; Tenby.—_Potentilla palustris_ Scop. Dowrog Common. — _Agrimonia odorata_ Mill. Frequent.—_Poterium Sanguisorba_ L. Tenby.—*_P. officinale_ Hook. fil. About St. David's.—_Rosa spinosissima_ L. St. David's; Whitsand Bay; Treleddyd Fawr Common. — _R. tomentosa_ Sm. Between St. David's and Whitchurch. — _R. lutetiana_ Leman, and _R. dumetorum_ Thuill. Both scarce.

Sedum anglicum Huds. Common on cliffs and rocks.

Myriophyllum spicatum L. On Dowrog Common. — _Callitriche stagnalis_ Scop.—_Peplis Portula_ L. Frequent.

Epilobium parviflorum Schreb. — *_E. obscurum_ Schreb. St. David's.—_E. palustre_ L. Frequent.

Eryngium maritimum L. Tenby. — _Conium maculatum_ L. St. David's. — _Apium graveolens_ L. St, David's. — _A. nodiflorum_ var. _ocreatum_ Bab. St. David's.—_A. inundatum_ Reichb. fil. Pwll Trefeithan. — _Fœniculum vulgare_ Mill. Solva. — _Crithmum maritimum_ L. St. David's. — _Œnanthe crocata_ L. St. David's.—_Daucus Carota_ L. St. David's.—_Caucalis nodosa_ Scop. Solva.

Asperula cynanchica L. Abundant on sandhills, Tenby. — _Sherardia arvensis_ L. Treleddyd Fawr Common.

Valeriana sambucifolia Willd. About St. David's.—_Valerianella dentata_ Poll. St. David's.

Dipsacus silvestris Huds. Cliffs, Porth Liska. — _Scabiosa Succisa_ L. and _S. arvensis_ L. Common.

Eupatorium cannabinum L. St. David's. — _Pulicaria dysenterica_ Gaertn. St. David's. — _Bidens cernua_ L. Treleddyd Fawr Common. —*_Anthemis nobilis_ L. On commons about St. David's.—_Chrysanthemum segetum_ L. Near Pen Berry.— _C. Parthenium_ Pers. and _Matricaria inodora_ L. Frequent. — _Tanacetum vulgare_ L. St. David's.—_Artemisia Absinthium_ L. Porth Clais.—_A. vulgaris_ L. St. David's. — *_Arctium minus_ Bernh. St. David's. — _Carlina vulgaris_ L. Caer Bwdy; Solva. — _Carduus pycnocephalus_ L. St. David's; Haverfordwest. — _Serratula tinctoria_ L. Dowrog Common.—_Hieracium umbellatum_ L. Haverfordwest; Newgate; Tenby, a dwarf state on the sandhills.—_Leontodon hirtus_ L. and _L. hispidus_ L. St. David's.

Jasione montana L. Abundant on walls and cliffs, St. David's.

Statice auriculæfolia Vahl. Porth Sele and Whitesand Bay.

Glaux maritima L. Tenby.—*Anagallis tenella* L. Abundant on wet commons, St. David's. — *Centunculus minimus* L. Treleddyd Fawr Moor; Pwll Trefeithan. — *Samolus Valerandi* L. Abundant on commons, St. David's.

Microcala filiformis Hoffmgg. & Link. Pwll Trefeithan, and in wet places on cliffs. — *Erythræa Centaurium* var. *capitata* Koch. Treleddyd Fawr Moor. — *Gentiana campestris* L. The Burrows; Traeth Mawr; Waun Fawr; Pwll Trefeithan. — *_G. baltica_ Murb. (agreed to by Mr. W. H. Beeby). Pwll Trefeithan. — *Menyanthes trifoliata* L. Pwll Trefeithan.

Lycopsis arvensis L. Fields, St. David's. — *Myosotis cæspitosa* F. Schultz, and *M. palustris* Relh. St. David's. — *Lithospermum officinale* L. Tenby.—*Echium vulgare* L. The Burrows.

Verbascum Thapsus L. St. David's. — *Linaria Elatina* Mill. Pen Berry. — *Antirrhinum majus* L. Walls, St. David's. — *A. Orontium* L. Fields near Porth Sele. — *_Euphrasia stricta_ Host. Porth Clais; Waun Fawr. — *_E. borealis_ Towns. Abundant on sandhills, Tenby. — *_E. curta_ var. _glabrescens_ Wettst. Treleddyd Fawr Moor.—*_E. occidentalis_ Wettst. Coast cliffs, St. David's.

Pedicularis palustris L. Frequent on wet commons. — *Bartsia serotina* Reichb. St. David's.

Utricularia minor L. Dowrog Common; Pwll Trefeithan.

Verbena officinalis L. Roadsides, St. David's; Tenby.

Mentha rotundifolia Huds. St. David's; Ponally, near Tenby. — *_M. piperita_ L. St. David's. — *Calamintha officinalis* Moench. Common about St. David's. — *Salvia Verbenaca* L. Tenby.— *Scutellaria galericulata* L. Frequent in marsh-land. — *S. minor* Huds. Abundant on wet commons. — *Marrubium vulgare* L. Solva. — *_Stachys palustris_ × _silvatica_ (_ambigua_ Sm.). Below Pont Clegyr.—*S. arvensis* L. Pen Berry.—*Ballota nigra* L. Frequent.

*_Scleranthus annuus_ L. Fields near Pen Berry.

Beta maritima L. Cliffs.—*Atriplex deltoidea* var. *prostrata* Bab. Whitesand Bog; Porth Clais. — *Salsola Kali* L. Abundant at Tenby.

Rumex conglomeratus Murr. Frequent. — *R. pulcher* L. Solva. —*R. Hydrolapathum* Huds. Frequent.

Euphorbia Paralias L. Sandhills, Tenby.

Parietaria officinalis L. Common at St. David's on walls.

Salix cinerea L. St. David's. — *_S. aurita_ L. St. David's.— *S. cinerea* × *viminalis*. Porth Clais.

Spiranthes autumnalis Rich. Abundant on all the commons about St. David's.—*_Orchis latifolia_ L. Near Clegyr Pont.

Narthecium Ossifragum Huds. Frequent, Waun Fawr Common; Dowrog; Treleddyd Fawr Moor.

Sparganium neglectum Beeby. On Treleddyd Fawr Moor.

Alisma ranunculoides L. Frequent. Pwll Trefeithan, &c.

Triglochin palustre L. Common about St. David's. — *Potamogeton natans* L. St. David's.—*P. polygonifolius* Pour. Pwll Trefeithan. — *_P. perfoliatus_ L. Stream above Solva. — *P. pusillus* L. Common in ditches, St. David's.

Eleocharis palustris R. Br. St. David's. — *E. multicaulis* Sm., viviparous state. Waun Fawr; Dowrog Common. — **Scirpus pauciflorus* Lightf. Traeth Mawr; Dowrog Common; Waun Fawr. — **S. fluitans* L. Waun Fawr. — *Carex arenaria* L. Whitesand Bay. — *C. paniculata* L. and *C. echinata* Murr. Dowrog Common. — *C. distans* L. Porth Clais. — **C. fulva* Good. Waun Fawr. — *C. flava* var. *cyperoides* Marsson. Pwll Trefeithan.

Ammophila arundinacea Host. Sandhills, Tenby. — *Aira caryophyllea* L. Common about St. David's. — **Festuca procumbens* Kunth (? in Top. Bot. ed. ii.). Strand at Solva.—*F. rigida* Kunth. Walls in Solva village. — *F. rottbœlloides* Kunth. Porth Clais.—*F. glauca* Lam. and *F. rubra* var. *pruinosa* Hackel. Porth Sele.—*Agropyron pungens* Roem. & Schult. Porth Clais. — **A. junceum* Beauv. Whitesand Bay.

Asplenium Adiantum-nigrum L. and *A. Trichomanes* L. St. David's, both frequent. — *Athyrium Filix-fœmina* Roth. Dowrog Common. — *Ceterach officinarum* Wilde. Walls, St. David's.—*Ophioglossum vulgatum* L. In a depression near the far end of Dowrog Common.

Chara fragilis var. *delicatula* Braun. Pwll Trefeithan. — **C. aspera* subsp. *desmacantha* H. & J. Groves. Pwll Trefeithan.—*C. vulgaris* L. Pwll Trefeithan.

NOTES ON AFRICAN CONVOLVULACEÆ.

By A. B. Rendle, M.A., D.Sc.

(Concluded from p. 22.)

Section Leiocalyx.

I. ochracea G. Don, Gen. Syst. iv. 270. *Convolvulus ochraceus* Lindl. Bot. Reg. t. 1060 (1827).

Angola; Loanda, *Welwitsch*, no. 6245.

I. (?) kentrocarpa Hochst. ex Rich. Fl. Abyss. ii. 70 (1851).

Angola; Ambriz, *Welwitsch*, no. 6174, and Golungo Alto, *Welwitsch*, nos. 6175, 6176.

There has been considerable confusion with respect to the Welwitsch numbers 6174, 6175, 6176, and 6245, which have been variously distributed between *I. ochracea* Don, *I. ophthalmantha* Hall. f., and *I. kentrocarpa* Hochst. In the Catalogue of Welwitsch Plants, i. 737, Mr. Hiern puts them together under *I. ochracea* Don, although Welwitsch himself considered that they included two new and distinct species.

No. 6245 formed part of the original *I. ophthalmantha* of Hallier, since united by him in part with *I. acanthocarpa* Hochst., and in part with *I. ochracea* Don, the Welwitsch number falling under the latter. This is no doubt its true place, as it agrees with the original figure in the Bot. Reg. (t. 1060, *Convolvulus ochraceus* Lindl.). It differs from the other three numbers in its larger flowers (the corolla measures 4 cm. long) and acute sepals.

In Engl. Jahrb. xxviii. 41, Hallier includes nos. 6175 and 6176 under *I. kentrocarpa* Hochst., a species based on an Abyssinian specimen, but localities for which are cited both in East and West Tropical Africa. No. 6174, which Hallier (*l. c.* 37) excludes with a query from *I. ochracea*, agrees with these two numbers, having the blunter calyx and shorter corolla. The three closely resemble *I. kentrocarpa* Hochst., but our specimen of the number (1420), on which the species depends, is but a fragment, and hardly allows a definite opinion. Dr. Hallier may have seen better material.

I. FRAGILIS Choisy in DC. Prodr. ix. 372 (1845). *I. tenuis* E. Meyer in Drège, Zwei pflanzengeogr. Docum. 139 (1843) (nomen). *I. fragilis* var. *glabra* Hall. f. in Bull. Herb. Boiss. vii. 50 (1899).
Transvaal; Pilgrim's Rest, *Rev. W. Greenstock*, 1879.

I. OBSCURA Ker, Bot. Reg. t. 239 (1817).
East Tropical Africa. Near Lake Marsabit, *Lord Delamere*, 1898; Masai, *Scott Elliot*, no. 6363, 1893; Tanganyka, *Scott Elliot*, no. 8364, 1894.
Rhodesia; Bulawayo, *Dr. Rand*, no. 604, September, 1898.

I. AQUATICA Forsk. Flor. Ægypt.-Arab. 44 (1775). *I. reptans* Poir. Encycl. Suppl. iii. 460 (1813).
East Tropical Africa; Lake Rudolf, *Dr. Donaldson Smith*, December 16th, 1899.

I. DAMMARANA Rendle in Journ. Bot. 1896, 36.
Rhodesia; Bulawayo, *Dr. Rand*, no. 273, January, 1898.

I. PAPILIO Hall. f. in Bull. Herb. Boiss. vi. 543 (1898).
Rhodesia; Bulawayo, *Dr. Rand*, no. 365, May, 1898.
Transvaal; Pilgrim's Rest, *Rev. W. Greenstock*, 1879.
South Africa, *Zeyher*, no. 1225.

I. SIMPLEX Thunb. Prodr. Pl. Capens. 36 (1794).
Rhodesia; Salisbury, *Dr. Rand*, no. 272, December, 1897.

I. prætermissa, sp. nov. Suffrutex humilis habitu, ut apparet, *I. simplicis* ramis ascendentibus teretibus rubro-brunneis verruculosis, partibus in junioribus viscidulis; foliis parvis crassiusculis anguste-lanceolatis cum apice cuspidato, marginatis, uninerviis, in petiolis brevibus, venis et margine crispato rubidis; pedunculis brevibus unifloris, bracteolis parvis lanceolatis; sepalis chartaceis, ovato-lanceolatis, breviter cuspidatis, dorso plus minus verruculosis, binis externis quam interna brevioribus; corolla marcida rosea calycem plus duplo execedente, areis mesopetalis cum nervis binis limitatis.

Described from a small specimen consisting of a somewhat sparsely leaved shoot, 13 cm. long by 1·5 mm. broad, springing from a short stouter woody axis, 2·5 cm. long, including two seasons' growth. Leaves tapering gradually from the rounded base to the shortly cuspidate apex, the largest 23 mm. long by 4 mm. broad at the base; petioles 4 mm. or less. Peduncles 6–7 mm. long, bracteoles 2 mm. long, 3 mm. below the calyx. Outer sepals 6–8 mm. long by about 3 mm. broad, the inner reaching 12 mm. long and narrowing to 2·5 mm. Corolla apparently about 3 cm. long, with a short tube about ·5 cm. in diameter.

Near *I. simplex* Thunb., which it closely resembles in habit and flower, but is distinguished by the broad-based lanceolate leaves.

Hab. South Africa, *Zeyher*, no. 1214, 1846.

I. WELWITSCHII Vatke ex Hall. f. in Engl. Bot. Jahrb. xviii. 146 (1893). *I. Hystrix* Hall. f. *l. c.*

I have not seen the specimen of Böhm's, on which Hallier based *I. Hystrix*, but from the plants which he assigns to this species in Bull. Herb. Boiss. vii. 53, including one collected by Scott Elliot in the Shire Highlands (no. 8639), there can be no doubt as to their identity with the West African *I. Welwitschii*. Hallier says of *I. Hystrix*, "præcedenti" (i. e. *I. Welwitschii*) "valde affinis, sed multo humilior densiusque foliosa," but the Shire specimen is larger than the average of the Angolan, and is certainly not more laxly leaved.

Section ERIOSPERMUM.

I. Rhodesiana, sp. nov. Suffrutex ramis ascendentibus (volubilibus ?) cinereo-pubescentibus subrubidis; foliis parvis, ovato-cordatis, obtusis, breviter petiolatis, in facie superiore fulvo-sericeis, in facie inferiore cinereo-pubescentibus cum venis curvulis prominulis; pedunculis unifloris, folia vix æquantibus, ut in bracteolis et calycis dorso cinereo-pubescentibus; bracteolis parvis a calyce remotis, lineari-oblongis; sepalis late-ellipsoideis ad obovatis; binis internis tria exterioria superantibus; corolla, staminibusque . . . ; disco hypogyno annulare prominulo, ovario glabro, subconico; stigmatibus didymis, subglobosis.

Specimen of a single slender woody shoot, 45 cm. long, broken off below, barely reaching 2 mm. in diameter. Leaves 2 cm. or less in length by 1·5 cm. or less in breadth; petioles not exceeding 4 mm. in length. Peduncles about 1·5 cm. long, ·5–·75 mm. thick; bracteoles 2·5–3 mm. long by 1 mm. or less in breadth, situated one-third the way up the peduncle. Sepals 5–7 mm. long, equal or slightly less in breadth; ovary 2 mm. long, style 13 mm. long.

Near *I. Holubii* Baker in Kew Bull. 1894, 72, but distinguished by its much smaller bracteoles, smaller leaves, &c.

Hab. Rhodesia; Bulawayo, *Dr. Rand*, no. 141, December, 1897.

I. HILDEBRANDTII Vatke in Linnæa, xliii. 511 (1882).

East Tropical Africa; Ukambane, 5-6000 ft., *G. F. Scott Elliot*, no. 6723, 1893-4.

I. KITUIENSIS Vatke, *l. c.*

East Tropical Africa; Kavirondo, *G. F. Scott Elliot*, no. 6991, 1893-4.

A form with small leaves, 3·5–4 cm. long by 5–6 cm. broad, and somewhat congested flowers.

I. ARGYROPHYLLA Vatke, *l. c.* 510.

East Tropical Africa; Langoro Road, 5,500 ft., *G. F. Scott Elliot*, no. 6377 *a*, 1893-4.

I. BUCHANANI Baker in Kew Bull. 1894, 73.

East Tropical Africa; Nyassaland, *Buchanan*, no. 682, 1891.

I. FRAGRANS Bojer in Hort. Maurit. 227 (1837) nomen. *Pharbitis vagrans* Boj. *l. c.* (nomen); Choisy in DC. Prodr. ix. 341.

East Tropical Africa; Nyanza, Berkeley Bay, *G. F. Scott Elliot*, no. 7068, 1893–4. West Tropical Africa; Congo, *Christian Smith*, nos. 10, 27.

I. Hierniana, sp. nov. Suffrutex caulibus volubilibus robustis velut tota planta cinereo-puberulis; foliis exacte cordatis acuminatis apiculatis, lamina petiolum subæquante, in pagina superiore sparse, in inferiore, præcipue in venulis prominulis, densius puberula; pedunculis brevibus cum floribus paucis superadditis laminam vix attingentibus, ut in bracteolis parvis caducis pedicello et calyce albido-puberulis; sepalis subæqualibus ellipticis obtusis subcoriaceis margine membranaceis; corolla calycem 4-plo excedente, glabra super basin tubulosam infundibuliforme, areis mesopetalis 5-nerviis bene limitatis; antheris sub ore corollæ, filamentis elongatis æqualibus; fructu . . . .

The ribbed soft woody shoots reach 3 mm. in thickness in the specimen, which, up to the backs of the sepals, bears a fine covering of very short soft curled whitish hairs, densest on the leaf-stalks, the backs of the leaf-veins, and the flower-stalks and exposed backs of the sepals. Leaves papery in consistence, blade 7–13 cm. long by 5·5–9 cm. broad. Peduncles ·5 cm. long; flowers subumbellate, geminate in the specimen, pedicels 6 mm. long, bracteoles lanceolate, mostly fallen, 2 mm. long. Sepals 8–9 mm. long by about 4 mm. broad. Corolla 4 cm. long, including a tube of about 8 mm., stamens 3·5 cm. long.

Near *I. fragrans* Bojer, but distinguished by the very short peduncle and the shortly puberulous inflorescence.

Hab. Cameroons, Bipinde, Urwaldgebiet, *Zenker*, no. 1614, 1898. "*Ipomœa* spec. aff. *paniculata*."

The specific name recalls Mr. Hiern's connection with the West Tropical African Flora in the elaboration of Dr. Welwitsch's collections, the account of which is now complete.

I. Hovarum, sp. nov. Suffrutex caulibus elongatis prostratis tortis, siccis compressis, plus minus cinereo-puberulis; foliis ovato-cordatis acuminatis cum margine subundulato, utrinque minute puberulis; petiolo velut pedunculis cinereo-puberulo quam lamina paullo breviore; pedunculis quam petioli 3-plo brevioribus, dichasiis paucifloris, bracteolis oblongis; sepalis chartaceis late ellipticis obtusis, glabridis; corolla rosea ad medium late tubulosa tum late infundibuliforme, calycem 6-plo excedente, glabra, areis mesopetalis 5-nerviis; genitalibus tubo inclusis; fructu . . . .

The specimen consists of a long trailing shoot more than 80 cm. long, hollow, and bearing a sparse whitish pubescence, denser in the younger part; greatest thickness 3 mm. Leaves papery when dry, reaching 8 or 9 cm. in length by 7 in width at the base, and the petioles 6 cm. Peduncle 2·5 cm. long, pedicel ·5 cm. or less, bracteoles caducous, 4–6 mm. long by 1·5–2 mm. broad. Calyx 12 mm. long; corolla 6 cm. long, the lower half tubular-campanulate, then broadly funnel-shaped, with a spread of 6 cm.

Approaches *I. paniculata* var. *indivisa* Hall. f. (*I. camerunensis* Taub.) in the shape of the leaf and corolla, but is distinguished by its conical buds and elliptical sepals. The large calyx also separates it from *I. fragrans* Bojer. In habit it recalls *I. asarifolia* R. & S., which it also somewhat resembles in the form of the flower; but it is distinguished by the shape of its leaves and larger oblong bracts.

Hab. Madagascar, *Hilsenberg & Bojer*.

ASTROCHLÆNA MALVACEA Hall. f. in Engl. Bot. Jahrb. xviii. 121 (1893). *Breweria malvacea* Klotzsch in Peters Mossamb. i. 245, t. 37 (1862). *Convolvulus malvaceus* Oliv. in Trans. Linn. Soc. xxix. 117 (1875).

East Tropical Africa; Kavirondo, no. 7124; Mpororo, 3000 ft., no. 8044; Shire, no. 8689; all *G. F. Scott Elliot*, 1893-4.

Natal, near D'Urban, *M'Ken*, no. 695 (in herb. Trin. Coll. Dublin); Delagoa Bay, *Bolus*, no. 1325, 1886.

Var. EPEDUNCULATA, var. nov. Planta humilis ramis brevibus aggregatis, foliis parvis ovatis, cymis 2–4-floris axillaribus sessilibus, floribus læte roseo-purpureis speciosis.

"Springs in pretty tufts." Branches 6–16 cm. long, the thickest 2·5 mm. in diameter at the base. Leaves not exceeding 2·5 cm. in length by 1·5 in breadth, with a petiole barely ·5 cm. long, generally smaller. Flower-pedicels ·5–1·5 cm. Sepals lanceolate to bluntly ovate, 5–7 mm. long by 2·5–3 mm. broad. Corolla infundibuliform, 4·5 cm. long, with a tube 2 cm. long by 3 mm. in diameter at the base; spread of mouth in dried specimen 4·5 cm.

Differs, and is at once distinguished from the species, by the sessile or almost sessile inflorescences.

Hab. Rhodesia; Salisbury, *Dr. Rand*, no. 511, September, 1898.

A. involuta, sp. nov. Suffrutex ramis strictis complanatis tortis, laxiter foliatis, velut pedunculis, pedicellis, et petiolis stellato-tomentosis; foliis ovato-cordatis obtusis, breviter petiolatis, utrinque densiter stellato-pubescentibus, in facie superiore rugulosis, venis venulisque in facie inferiore prominentibus; floribus in dichasiis axillaribus, pedunculis quam folia sæpius brevioribus, bracteolis parvis ovatis caducis; sepalis binis externis ellipticis obtusis, dorso prominenter pinnatinerviis stellato-pubescentibus, sepalis internis ab externis majoribus fere occlusis, ellipticis ad oblongis, nervo mediano cariniforme, stellato-pubescente; corolla marcida sæpissime marginibus involutis, purpurea, ut apparet tubuloso-infundibuliformi, areis mesopetalis glabris cum nervis binis conspicuis limitatis; antheris inclusis sagittatis, polline echinulato; stigmatibus oblongis; fructu . . .

The specimens consist of the upper portions (about 30 cm. long) of several laxly leaved shoots with internodes hollow, flattened and grooved, and about 2 mm. broad, bearing, like the peduncles, pedicels, leaf-stalks, and prominent nervation on the under surface of the leaf, a dense faintly ferruginous tomentum of short stellate hairs. Leaves 2·5–3 cm. long or less, and nearly as broad, the upper surface rugulose by the depression of the veins and veinlets, petioles ·5–1 cm. long. Peduncles 1–2·5 cm. long; bracteoles minute, ovate, caducous, barely 3 mm. long, pedicels

7–12 mm. long. Two outer sepals 7–8 mm. long by 5–6 mm. broad, the two inner slightly shorter and narrower, the third intermediate in size and shape. Corolla (withering) 3 cm. long, with tube 1–1·5 cm. long and 3 mm. in diameter, apparently of a deep purple colour. Filaments 4–8 mm. long, anthers 3 mm. long, slender style 12 mm. long.

Near *A. malvacea*, but certainly distinct, from its cordate-based leaves with their rugulose upper surface, broader sepals, &c.

Hab. British East Africa; near Lake Marsabit, *Lord Delamere*, 1898.

A. Delamereana, sp. nov. Suffrutex caule robusto velut pedunculis, petiolisque densiter subferrugine stellato-tomentoso; foliis pro genere magnis late ovatis vel suborbicularibus, obtusis, basi subcordatis, margine undulato, utrinque stellato-pilosulis, venis et venulis in facie inferiore prominentibus stellato-tomentosis, petiolis robustis, quam folia 5-plo brevioribus; floribus pluribus brevi-pedicellatis, in pedunculis robustis quam folia brevioribus, capituliformiter aggregatis, bracteolis parvis oblongo-acuminatis, caducis; sepalis binis externis ovatis obtusiusculis dorso stellato-pilosulis, cetera angustiora (lanceolata) occludentibus; corolla calycem quadruplo superante, ut apparet anguste infundibuliforme, areis mesopetalis glabris, cum nervis tribus conspicuis lineatis; filamentis inæqualibus tubo inclusis, antheris oblongo-sagittatis, polline echinulato; stigmatibus rhomboidalibus; ovario glabro; fructu . . .

The specimen consists of the ends of a stout flowering branch, with several closely arranged leaves and axillary peduncles bearing a number of flowers crowded in a head. Shoot strong, woody, ·5 cm. thick. Leaves 6–10 cm. long and broad, base shallowly cordate; petiole 1·5–2·5 cm. long. Peduncles generally 3–5 cm. long by about 2 mm. thick; pedicels generally less than ·5 cm. long. Sepals about 1 cm. long, the outer 4 mm. broad, the inner narrowing to 3 mm. Corolla 4·5 cm. long, the tube ·5 cm. or less in diameter; filaments about 1 cm. long or less, anthers ·5 cm.

A well-marked species, distinguished from *A. malvacea* by the broader more orbicular leaf, the dense capitate inflorescence, longer sepals, &c.

Hab. British East Africa; Cantalla and Hadda, *Lord Delamere*, 1898.

A. HYOSCYAMOIDES Hall. f. in Engl. Bot. Jahrb. xviii. 121 (1893). British East Africa; Uganda, *G. F. Scott Elliot*, no. 6300, 1893–4.

LEPISTEMON AFRICANUM Oliv. in Hook. Icon. Pl. t. 1270 (1878). Mt. Ruwenzori, *G. F. Scott Elliot*, no. 8098, 1893–4.

DICHONDRA REPENS Forst. var. SERICEA Choisy in DC. Prodr. ix. 451. British East Africa; Kavirondo, *G. F. Scott Elliot*, 1893–4, no. 7062.

EVOLVULUS NUMMULARIUS L. Sp. Pl. ed. ii. 391 (1762). British East Africa; Nyanza, *G. F. Scott Elliot*, 1893–4, no. 7135,

E. ALSINOIDES L. *l. c.* 392.
British East Africa; Uganda, *G. F. Scott Elliot*, 1893–4, no. 7444. Rhodesia; Bulawayo, *Dr. Rand*, no. 127, Jan. 1898.

SEDDERA CAPENSIS Hall. f. in Bull. Herb. Boiss. vi. 529 (1898).
Rhodesia; Salisbury, *Dr. Rand*, no. 126, Dec. 1897.

S. SOMALENSIS Hall. f. in Engl. Bot. Jahrb. xviii. 90 (1893).
Somaliland; Darar, *Dr. Donaldson Smith*, Sept. 1894.

CONVOLVULUS SAGITTATUS Thunb. var. PARVIFLORUS subvar. ABYSSINICUS Hall. f. *l. c.* 533.
Somaliland; Habrawal, *Dr. Donaldson Smith*, 1899. British East Africa; Nyanza, *G. F. Scott Elliot*, 1893–4, no. 7145. Rhodesia; Salisbury, *Dr. Rand*, Sept. 1898, no. 510.

C. liniformis, sp. nov. Herba pusilla glabra, caulibus ascendentibus tenuibus ramosis; foliis breviter petiolatis linearibus basi inconspicue auriculatis, apice breviter acutis; floribus solitariis, pedunculis folia paullo excedentibus, bracteolis parvis lanceolatis; sepalis subæqualibus, oblongis, breviter mucronatis, chartaceis; corolla calycem 2½-plo excedente, rosea, late infundibulare, areis mesopetalis male limitatis; staminibus inclusis; stigmate lineari-oblongo; fructu . . .

A small low-growing plant, the specimens consisting of slender ascending shoots with spreading-ascending branches; the longest shoot is 10 cm. high, and their thickness is from ·5 to ·7 mm. Leaves 8–15 mm. long including a stalk of about 2 mm., 1·5 mm. or less in width. Peduncles 2 cm. or less in length, bracteoles 2 mm. long, 3–4 mm. below the calyx. Sepals 7–8 mm. long by 2·5–3·5 mm. broad. Corolla 2 cm. long, and as broad at the mouth.

Approaches the slender-leaved forms of *C. sagittatus* Thunb., but is distinguished by its uniformly linear leaves with only a trace of auricles at the base, and by its larger flowers.

Hab. South Africa; *Zeyher*, 1846, no. 1220; Schoonstroom River, *Burke* (no. 283, in herb. Trin. Coll. Dublin).

C. Hilsenbergiana, sp. nov. Suffruticosa volubilis caulibus gracilibus subferrugine pilosulis; foliis cordatis obtusis margine crenulatis, petiolis venisque præcipue in pagina inferiore velut pedunculis subferrugine pilosulis; petiolo laminam subæquante; pedunculis quam folia brevioribus uni- vel bi-floris; bracteolis subulatis parvis; sepalis rotunde ellipticis breviter cuspidatis chartaceis margine interdum quoque dorso plus minus subferrugine pilosulis; corolla calycem vix duplo excedente breviter et late infundibuliforme, areis mesopetalis cum nervis 5 parallelis delineatis sub apice pilosulis; staminibus inclusis, polline leve sphæroido-tetrahedrale; stigmate lineari-oblongo; pericarpio glabro, capsula 2-valvata, seminibus 2 nigris granulatis.

The specimen consists of slender detached sparsely branching shoots to 65 cm. long, and barely reaching 2 mm. in thickness. Leaves reaching 5·5 cm. long including a petiole of 2·5 cm., by 3 cm. broad, becoming gradually smaller as we ascend the upper part of the shoot, almost glabrous on the upper surface, pilosulose on the veins of the lighter coloured lower face. Flowers solitary on a short peduncle 6–10 mm. long, or the lower geminate on longer peduncles (to 3·5 cm.); bracteoles 3–4 mm. long. Sepals 6 mm. long by about 4 mm. broad. Corolla scarcely exceeding 1 cm. long. Anthers shortly sagittate. Ovary 2-celled, 4-ovuled, capsule containing two black seeds with granulated testa.

Is perhaps nearest the South African *C. hastatus* Thunb. and *C. sagittatus* Thunb., which it resembles in the form of the flower, but is at once distinguished by the very characteristic cordate crenulate margined leaves. It also approaches *C. parviflorus* Vahl, but is distinguished by the solitary or geminate flowers, blunt sepals, and obtuse crenulate leaves.

Hab. Madagascar; near Tannanarivo, *Hilsenberg & Bojer;* Ankafana and Bara, *Deans Cowan*, 1880.

C. Bulleriana, sp. nov. Suffrutex humilis glaucescens, ramis prostratis tenuibus, minute pubescentibus; foliis breviter petiolatis, angusto-hastatis, cum margine integro, lobis basalibus parvis recurvulis, utrinque pilosulis sæpius planis; floribus solitariis, pedunculo folium excedente caule simili; bracteolis linearibus velut pedicello pilosulis; pedicello quam calyx breviore; sepalis magnis chartaceis, ovatis, apice obtusis vel acutiusculis, dorso pilosulis, externis quam interiores majoribus; corolla lutea, calycem duplo excedente, infundibuliforme, lobis triangularibus, areis mesopetalis male limitatis dorso pilosulis; polline tetrahedrale, glabro; stigmatibus filiformibus sublongis; fructu . . .

The slender spreading branches 20–30 cm. long, 1 mm. in diameter. Leaves 2·75–3·5 cm. long, 2·5–4 mm. broad above the hastate base, from which the blade tapers gradually to an obtuse or subacute apex, basal lobes blunt, 2–3 mm. long, sometimes with an indication of a small secondary lobe on the outside; petioles slender, 4–7 mm. long. Peduncle of the only open flower 3·5 cm. long, bracteoles 6–8 mm. long, pedicel 1 cm. Outer sepals 1·5 cm. long by 7 mm. broad at the base, reddish brown when dry. Corolla a little over 3 cm. long; the barely exserted stigmas 6 mm. long. Fruit absent.

Approaches *C. plicatus* Desv. in its habit, large ovate sepals, and general structure and arrangement of the solitary flowers, but is at once distinguished by its narrowly hastate leaves with uncut margins; the flowers are also larger, and yellow in colour.

Hab. Natal; hill near Mooi River, at 4500 ft., *J. M. Wood*, no. 6206, Dec. 8, 1896.

MERREMIA PALMATA Hall. f. in Engl. Bot. Jahrb. xviii. 112 (1893).

Rhodesia; Bulawayo, *Dr. Rand*, Dec. 1897, nos. 128, 129; May, 1898, no. 364. Dammara-land, *T. G. Een*, 1879.

M. PTERYGOCAULOS Hall. f. *l. c.* 113.

British East Africa; Uganda, *G. F. Scott Elliot*, 1893–4, no. 7242.

M. ANGUSTIFOLIA Hall. f. *l. c.* 117.

British East Africa; Uganda, *G. F. Scott Elliot*, 1893–4, no. 7217. Rhodesia, Bulawayo, *Dr. Rand*, Dec. 1897, no. 130.

M. Bowieana, sp. nov. Suffrutex caulibus volubilibus teretibus rigidis glabris striatis; foliis sessilibus crassiusculis linearibus mucronulatis, siccis sæpius plicatis, in facie superiore pilosulis, inferiore glabrescentibus; floribus sæpius solitariis, interdum dichasialibus, pedunculis caule similibus, sed parce pilosulis, folia subæquantibus; bracteolis lineari-lanceolatis; pedicello calycem haud æquante, ferrugine pilosulo; sepalis late ellipticis ad late obovatis, chartaceis, dorso ferrugine pilosulis, binis externis tres interiores excedentibus; corolla calycem vix duplo excedente, e tubo brevi infundibuliforme, areis mesopetalis dorso dense et ferrugine pilosis; staminibus inclusis, filamentis tenuibus superne attenuatis, antheris linearibus basi sagittatis, polline ellipsoideo, granuloso; stigmate parvo globoso, ovario glabro; fructu . . .

Stem slender, wiry, 1·25 mm. in diameter. Leaves 3–4 cm. long, 2·5–4 mm. broad, a few of the upper shorter and broader and irregularly shaped (spathulate, or lanceolate and obscurely 3-dentate). Peduncles 2·5–4·5 cm. long; bracteoles 7–8 mm. long by 2 mm. broad; pedicels 1 cm. long or less. Sepals 13–10 mm. long, 10 mm. or less in breadth; corolla 2·5 cm. long, tube scarcely 8 mm. long, 3 mm. broad, mouth apparently about 1·5 cm. broad. Style in withered flowers 1·5 cm. long, the terminal globose; stigma less than 1 mm. in diameter.

A very distinct species, nearest to *M. angustifolia*, but distinguished by its stouter rigid wiry stem, thick stiffish linear leaves, and larger flowers, especially the conspicuous calyx.

Hab. Cape Colony; on roadsides in the districts of Zwellendam and George, *Bowie*.

M. malvæfolia, sp. nov. Suffrutex caulibus elongatis, subflexuosis, ascendentibus, e specimine simplicibus ut tota planta minute hispidulis, siccis compressis; foliis inter minores reniformibus, trilobatis, lobis basalibus bilobulatis, nervis principibus 3 palmatis, velut nervulis prominulis, petiolis quam folia brevioribus; pedunculis valde elongatis, folia pluries superantibus, curvatis, unifloris; bracteolis parvis, paullo inter se discretis, anguste oblanceolatis; sepalis ellipticis, obtusis, subcoriaceis, subæqualibus, dorso sparse hispidulis; corolla (lutea?) calycem 2½-plo excedente, late infundibuliforme, areis mesopetalis colore et nervis 5 (? semper) distinctis dorso pilosulis; antheris sagittatis tortis, filamentis subæqualibus subulatis; polline ellipsoideo, espinuloso, superficie granuloso, cum areis tribus depressis vix granulosis longitudinalibus; stigmatibus globosis.

The specimen consists of a single slender shoot nearly 1 metre long, springing from a slender woody base; it scarcely reaches 1·5 mm. in breadth, and, like the whole plant, bears a barely perceptible ash-coloured hispidulous covering. Leaves 1·5–2·5 cm. long, 2·5–3·5 cm. broad, 3-lobed to the middle, the lateral lobes more shortly and unequally 2-lobed; hispidulous chiefly on the veins of the lower surface. Petioles 1–2 cm. long. Peduncles about 10 cm. long; bracteoles 5–6 mm. long by 2 mm. broad above the middle. Sepals 10–12 mm. long by about 5 mm. broad. Corolla 2·5 cm. long.

A very distinct species, belonging to the same set as *M. quercifolia* Hall. f., but distinguished at once by its mallow-like leaves.

Hab. Cape Colony; Kowie sand hills, Eastern frontier, *P. MacCowan*, no. 403, Dec. 1863 (in herb. Trin. Coll. Dublin).

NOTES ON JERSEY PLANTS.

By L. V. Lester, M.A., F.L.S.

The following rough notes, compiled during five years' residence in Jersey, may be of interest to British botanists. Babington's *Primitiæ Floræ Sarnicæ*, published in 1839, the result of two visits to the Channel Islands in July–August, 1837, and June–August, 1838, is out of date and most misleading. Many plants are included in it, mostly on the authority of Professor Lagasca and Mr. B. Saunders, which certainly never grew in Jersey;* many other plants are omitted. Mr. J. Piquet published a list of Jersey plants in the *Proceedings* of the Société Jersiaise in 1896, which represents the flora of the island much better; but it is not much more than a very useful catalogue, and rarely distinguishes between natives and foreigners. In the course of five years' fairly assiduous botanizing I have collected materials for a Flora of Jersey, which I hope before very long to publish; and I should be very grateful if any botanists who have records or notes which they do not intend to use themselves would be kind enough to communicate them to me.

Ranunculus ophioglossifolius Vill. is extinct. — *R. chærophyllus* L. is still to be found in the only known locality. Probably native.

Fumaria Boræi Jord. is a most abundant and characteristic Jersey plant.

Crambe maritima L. Extinct.

Viola nana DC. Abundant in sandy places.

Dianthus gallicus DC. A plant found growing in some quantity by Mr. Piquet, in 1897, in an out-of-the-way part of the sandy bay of St. Ouen's, was thus named by Mr. F. N. Williams in Journ. Bot. 1898, p. 493. There is a large patch, and the locality looks as if it were beyond suspicion; but St. Ouen's Bay is full of casuals and naturalized aliens. Not found in Normandy, but common on the sands of the west coast of France as far north as Quimper, in South Brittany. Just possibly native; certainly well established.

The abundance of small *Leguminosæ* belonging to the genera *Trigonella*, *Medicago*, *Trifolium*, *Lotus*, and *Ornithopus* is a marked feature. — *Trifolium Molinerii* Balb. Only on a small islet in Portelet Bay, accessible at low water. — *T. strictum* L. One of the rarest of Jersey plants.

---

* [The mistakes were probably due to the latter, as Lagasca knew plants well. In his diary under Aug. 7, 1837, Babington writes: "Called upon Mr. B. Saunders of the Caesarean Nursery, who showed us a list that he had formed of the native plants of the island, and allowed us to extract those names which did not occur in our list" (*Memorials of C. C. Babington*, p. 66).—Ed. Journ. Bot.]

Ludwigia palustris Elliott. Probably extinct.—*Œnothera odorata* Jacq. Thoroughly naturalized and abundant in sandy places. Apparently spreading.

Scabiosa maritima L. One locality in St. Ouen's Bay. Lloyd (Fl. de l'Ouest de France) does not regard it as native north of the Gironde. Probably introduced at some time or other with lucerne seed.

Gnaphalium undulatum L. An African species from the Cape of Good Hope, thoroughly naturalized in several localities in the south-west of the island. Naturalized also in Normandy and Brittany. Name confirmed by Herr J. Freyn (Report of Bot. Exch. Club, 1897). — *Diotis candidissima* Desf. Only known from one locality, and now destroyed by the building of a sea-wall in St. Ouen's Bay. Much of the best botanizing ground in the sandy bays is being rapidly spoilt by similar useless and costly constructions. A species with apparently a diminishing area.—*Matricaria maritima* L. = *Pyrethrum maritimum* Sm. Abundant in many places on the coast. It is hard to believe that this is nothing but a variety of *M. inodora* L., but Lloyd declares that he raised ordinary inland *M. inodora* from the seeds "dès la première année," at the same time acknowledging that it is a "remarkable variety." — *Centaurea paniculata* L. cannot, I think, be regarded as a native, if its continental distribution is taken into account. It is not found in Normandy, Brittany, or West France. In Jersey it is abundant in a single locality, close to the *Scabiosa maritima* L., where it has been for at least thirty years. The case of *C. aspera* L. is slightly different. It is abundant in St. Ouen's Bay, and rare in the south-east of the island. In Normandy it seems to be a casual, and Lloyd regards it as introduced on the coast of Brittany. In Guernsey it is, according to Mr. E. D. Marquand, "very rare and local." Just possibly native, but to be regarded, I am afraid, with suspicion.—*C. Calcitrapa* L., if ever native, is now certainly extinct. — *Hieracium Pilosella* L. var. *pilosissimum* Wallr. (*H. Peleterianum* Mér.) is extremely abundant. The type is comparatively rare.—*H. umbellatum* L. var. *littorale* Lindeb. is common on the cliffs of the north coast. — *Hypochæris maculata* L. is plentiful in a single locality, which is also the only station in the Channel Islands for the Cowslip. It is not found in Guernsey, Normandy, or Brittany, or in West France north of the Loire; but the locality seems quite above suspicion, and the English counties in which it occurs are widely separated from one another.

Anchusa sempervirens L. Frequent in hedges and near houses, and in one place apparently native. It looks native in the woods about Dinan, in Brittany. — *Echium plantagineum* L. is abundant. It was plentiful about St. Helier's in Ray's day (*Synopsis*, ed. 2, 119 (1696)). On the other hand, it is only a rare casual in Guernsey, and does not appear in Normandy, or in West France north of the Loire.

Linaria Pelisseriana Mill. has become extremely rare, and is probably doomed.

Mentha Pulegium L. Probably extinct.

Atriplex portulacoides L. Destroyed in its only station by the operations for the extension of the harbour at St. Helier's, which were afterwards discontinued.

Suæda maritima Dumort. ? Extinct. I have seen a Jersey specimen.

The only Willows which can be said with certainty to be native are *S. cinerea* L., which is very common, and *S. repens* L., which is only found in one locality.

Narcissus Pseudo-Narcissus L. Locally abundant in woods and on the cliffs. Omitted from Babington, and not in Guernsey.

Lagurus ovatus L. has been introduced from Guernsey, and is well established in St. Ouen's Bay.—*Bromus madritensis* var. *rigidus* Bab. (not Roth, whose plant is "a stouter form with a larger panicle" (see E. Hackel in Report of Bot. Exch. Club, 1898, p. 593). On the islet in Portelet Bay on which *Trifolium Molinerii* grows, and also about Gouray.—*B. maximus* Desf. Abundant in sandy places. Not *B. rigidus* Roth, as in the *London Catalogue*, which is "nothing but stout *madritensis*" (Hackel, *l. c.*), though placed by Grenier and Godron under *maximus*.

Since the publication of his list in 1896, the following plants have been added to the Jersey flora by Mr. Piquet, in a short supplementary list published in 1898:—

Carex paniculata L. — *Phalaris minor* Retz. has been plentiful for the last few years on and near the railway to the east of St. Helier's, but cannot be regarded as a native, though Mr. C. R. P. Andrews considered it to be indigenous in Guernsey. See Journ. Bot. 1900, p. 33, where the plant is described and figured. — *Ophioglossum vulgatum* L. was discovered by a lady then residing in Jersey, who showed me the locality in 1897.

In Journ. Bot. 1900, p. 278, Mr. S. Guiton adds *Vicia lutea* L. from the rocky hill on which Mt. Orgueil Castle is built. A doubtful native: the old Castle grounds are full of semi-naturalized relics of cultivation.

Corydalis claviculata DC. and *Orchis pyramidalis* L.

The following plants, for which I am responsible, have not, to my knowledge, been recorded for Jersey before:—

Frankenia lævis L. Plémont, 1899. Apparently extinct in Guernsey. It is included in Babington from the Grève d'Azette, but on the authority of Mr. B. Saunders, which is quite valueless.

Sagina ciliata Fr. La Moie, 1899.

Trifolium maritimum Huds. St. Aubin's Bay, 1898. Possibly only a casual.

Anthriscus silvestris Hoffm. The Ecréhos Rocks, eight miles east of Jersey. Common in Alderney (*Mr. E. D. Marquand*), not in Jersey or Guernsey.

Galium ochroleucum Syme. Portelet Bay and West Mount, 1897.

Hieracium rigidum Hartm. var. *acrifolium* Dahlst. (*fide* Rev. W. Moyle Rogers). Waterworks Valley, 1897. Whether this is the same as "*H. lævigatum* Willd. Koch. var. β," recorded by Babington from the Quenvais, I do not know.

Lysimachia Nummularia L. Longueville, 1900. Another of Mr. B. Saunders's records.

Orobanche Hederæ Duby. St. Helier's, 1897. Mt. Orgueil, where Mr. E. D. Marquand found it in abundance, 1900.

Luzula Forsteri DC. St. Aubin's, 1898. "Jersey, Prof. La Gasca," Bab.—*L. maxima* DC. Bonne Nuit Bay, 1898.

Lemna polyrrhiza L. Samarès, 1899.

Zostera nana Roth. Often washed up in St. Aubin's Bay and on the Grève d'Azette.

Carex Pseudo-cyperus L. St. Ouen's Pond, 1900. Inaccessible, except in a very dry summer.

Deschampsia flexuosa Trin. St. Helier's, 1897. — *Festuca arundinacea* Schreb. St. Aubin's Bay, 1897.

Chara aspera Willd. St. Ouen's Pond, 1900. Name confirmed by Mr. H. Groves.

Nitella flexilis Agardh. St. Peter's Valley, 1900. Named by Mr. H. Groves.

SOME PROPOSED CHANGES IN NOMENCLATURE.

By James Britten, F.L.S.

In the course of working out the nomenclature for the *Illustrations of the Botany of Cook's First Voyage*, now in course of publication, certain changes have seemed necessary, which it may be well to put on on record in a form more easily accessible. One such change has already been noted in the substitution of *Cosmia* for *Calandrinia* (Journ. Bot. 1900, 76); those now to be given affect genera which will appear in the part of the *Illustrations* shortly to be issued.

Huttum.

This ugly name, which, like many by the same author, seems devoid of meaning, was published by Adanson in his *Familles des Plantes*, ii. 88 (1763). There is no doubt as to what he had in view, for in his Index he cites "Rumph. 3, t. 114 à 116," and the first of these plates is cited by the Forsters when establishing their *Barringtonia* (Char. Gen. p. 76, t. 38 (1776)).

There has been so much divergence of opinion as to the position of the imperfect specimen collected by Banks & Solander and preserved in the National Herbarium, that I propose to follow Miers in regarding it as a distinct species, for which I retain his specific name; it will therefore stand as *Huttum calyptratum*. Seemann (Fl. Vit. 83) assigns it doubtfully to *H.* (*Barringtonia*) *edule;* Bentham (Fl. Austral. iii. 28) refers to it as intermediate between *H.* (*B.*) *speciosum* and *H.* (*B.*) *acutangulum;* Mueller (Fragm. ix. 118) places it under *H.* (*B.*) *racemosum*, to which it is certainly more nearly allied than to either of the other species named. None of these authors, however, consulted the plate, which will be reproduced in the *Illustrations*.

CUMBIA.

This name was published, as cited in the *Index Kewensis*, by Francis Buchanan (afterwards Hamilton) in his *Journey from Madras*, iii. 187 (1807). The entry stands simply as "*Cumbia.* The *Pelon* of the *Hort. Mal.*"[*]; but this citation of a good figure and full description, which has always been recognized as representing the plant usually known as *Careya arborea*, is sufficient to justify the retention of *Cumbia*, and to prevent its being regarded as a *nomen nudum*. That Hamilton himself intended to establish the genus is clear from his statement in *Trans. Linn. Soc.* xv. 96 (1827), where, while adopting Roxburgh's name *Careya* for the tree, he says: "I had previously called it *Cumbia*, and under this name gave specimens and a drawing to Sir J. E. Smith." He here (*l. c.* 97) adds a specific name to his genus (wrongly citing it as from *Mysore*, iii. 187), and calls the tree *Cumbia*[†] *Coneanæ*. The name of the Australian species will be CUMBIA AUSTRALIS.

NELITRIS.

As pointed out by Trimen (Fl. Ceylon, ii. 339), "the genus *Timonius* dates only from [DC. Prodr. iv. 461] 1830, and should rightly be superseded by *Nelitris* [Gærtn. Fruct. i. 134] (1788); for Gærtner's figure of the fruit (t. 27, f. 5) shows that this was the plant intended. He has in the text, however, confused it with some *Eugenia*, the specimens having been named 'Wal-jambu.' The name thus became applied by De Candolle to a genus of Myrtaceæ (properly *Decaspermum* Forst.)."

The type of the genus is *N. Jambosella* Gærtn. *l. c.* (*T. Jambosella* Thw. Enum. 153 (1859)), a name erroneously given in the *Index Kewensis* as a synonym of *T. Kœnigii;* the widely distributed *T. Rumphii*, with which as an Australian plant I am concerned, may be called N. TIMON, that being the earliest specific name; it is the *Erithalis Timon* of Sprengel (Pugillus, i. 18 (1813)).

NIEBUHRIA.

Niebuhria of Necker (Elem. i. 30 (1790)) must, I think, replace the generally accepted *Wedelia* of Jacquin.

In his *Iter Hispanicum* (1758), Loefling describes two genera—*Wedelia* (p. 180) and *Allionia* (p. 181). In 1759, Linnæus (Syst. ed. 10, 890) united the two genera under the latter name, and gave trivial names to each, calling Loefling's *Allionia*, *A. violacea*, and his *Wedelia*, *A. incarnata*. The latter has been accepted as the type of the genus *Allionia*, of which indeed it is the only species retained in the *Index Kewensis*, where the genus is referred to "Loefl. Iter, 181 (1758); Linn. Syst. ed. x. 890 (1759)."

Lœfling's *Allionia* = *Oxybaphus* of L'Heritier and of authors, for which it has been restored by recent North American botanists

---

[*] Vol. iii. p. 35, tab. 36.

[†] It appears from Hamilton (*l. c.*) that *Cumbia* was formed by him from the native name Kumb or Kumbi.

(Morong and Britton-and-Brown). This necessitates the recognition of *Wedelia* as the correct genus-name for the plant called by Linnæus *Allionia incarnata*. Mr. Jackson cites *Wedelia incarnata* (in italics) as from "Linn. Syst. ed. x. 890"; this combination, however, is not given by Linnæus, and the name will stand as of Jacks. Ind. Kew. ii. 122^b (1895). Two other names are given in the *Index* under *Wedelia*—"*incarnata* Linn. Syst. ed. x. 890," and "*malachroides* Benth. Bot. Voy. Sulph, 114"; the former is not given by Linnæus under *Wedelia*, and the latter appears in the *Botany of the Sulphur* (p. 44) as "Allionia (Wedelia) malacoides."

If *Wedelia* of Lœfling be retained, it is clear that the later *Wedelia* Jacq. (Enum. Carib. 8 (1760)) must go; the earliest name for this appears to be *Niebuhria* of Necker (Elem. i. 30 (1790)), Scopoli's earlier genus of that name being referred to *Baltimore;* the later *Niebuhria* of De Candolle is now usually combined with *Mærua*. The two Australian species with which I am concerned are:—

N. BIFLORA.
Wedelia biflora DC. apud Wight Contrib. p. 18 (1834).
Wollastonia biflora DC. Prodr. v. 546 (1836).

N. SPILANTHOIDES.
Wedelia spilanthoides F. Muell. Fragm. v. 64 (1865).

Although *Niebuhria* is not taken up in the Welwitsch Catalogue, Mr. Hiern concurs in its adoption.

RAZUMOVIA.

This genus was founded by Sprengel in 1807 (Mant. Prima, 1807, p. 45) for the plant subsequently known as *Centranthera humifusa* Wall., a name retained in the *Flora of British India* (iv. 301), where, however, Sprengel's name is cited as a synonym. *Razumovia* clearly antedates *Centranthera*, which was published by Brown (Prodr. 438) in 1810. *C. hispida* Br. will therefore stand as RAZUMOVIA HISPIDA, and *C. humifusa* will be superseded by R. TRANQUEBARICA Spreng.

MYXOBACTERIA.

By A. LORRAIN SMITH.

IN 1892, Prof. Thaxter, of Harvard, published, in the *Botanical Gazette*, xvii. p. 389, the first results of his observations on the group of *Schizomycetes* that he has named *Myxobacteria*. These are bacteria that live on dead or decaying organic substances. They have power of slow movement, and flow together, forming collectively bodies of very definite and distinctive shape. The author distinguishes two periods in the life-history of these organisms. In the first, which he terms the vegetative period, there is a slow swarming of rod-like bacteria, which form a gelatinous secretion that connects the different individuals together. These swarm over the matrix on which they live, and, at certain definite points, they flow upwards, and form the variously shaped, erect bodies that he has described. This is the second state, and is the resting or encysted stage of the *Myxobacteria*; a gelatinous wall is formed round the cysts, and they are capable of resisting adverse conditions such as cold, drought, or mechanical disturbance. In the simplest types, the resting stage is formed of simple, papillate, upright bodies, sessile or supported on a stalk; but others have a much more complicated appearance, being fashioned into coralloid coiled strands, or into elongate branched stalks with numerous heads. In due time the contents of the cyst, rods or cocci, emerge, and the life-cycle begins over again. The cysts of the *Myxobacteria* are brightly coloured, so far as they have been observed; they are usually of some shade of yellow or red, but brown and green species have also been noted. Most of them retain their bright colours, with some variations, through the different life-stages.

Prof. Thaxter distinguishes three groups or genera of *Myxobacteria*—*Chondromyces* and *Myxobacter*, in which the encysted and swarming stage are equally composed of rods; and *Myxococcus*, in which the rods become transformed into cocci or spores when they form into cysts. In *Chondromyces* the cysts remain more softly gelatinous, and may fuse together if adjacent to each other. The cysts of *Myxobacter* have a thick-walled gelatinous envelope, in which are included one or more cysts. The first member of the family that was recorded was *Chondromyces crocatus* Berk. & Curt., from South Carolina. It has an upright, somewhat branched irregular stalk, and several heads. The authors placed it among the *Hyphomycetes*, where it remained until rescued by Prof. Thaxter, who has had it under observation, and who has described its true nature and affinities.

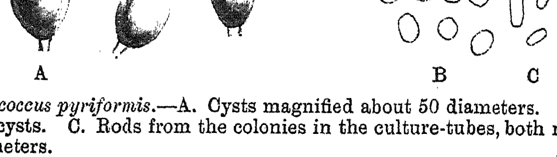
Zukal, in a paper published in the Berich. Deut. Bot. Gesel. vol. xv. p. 542 (1897), states that the old monotypic genus *Polyangium* of Link is the same as Thaxter's genus *Myxobacter*, and claims for it priority of nomenclature. He had had *Polyangium vitellinum* under observation some years ago, and considered it then to be a species of Mycetozoon; it is to be regretted that Zukal does not give a more detailed account of his observations of *Polyangium*. In 1886, Schröter, in Pilze Schl. p. 170, founded the genus *Cystobacter*, with two species. Both of these are typical *Myxobacteria*, and, in a paper published in the Bot. Gazette, vol. xxiii. p. 395 (1897), Prof. Thaxter accepts *Cystobacter fulvus* Schröt. as a member of his *Myxobacter* group, and sinks the name in favour of Schröter's. The other species described by Schröter belongs to the older genus *Chondromyces*.

In the same paper Prof. Thaxter follows up his previous observations by a further description of spore-formation in *Myxococcus*. The rods in this genus do not divide for sporulation, as he at first thought they did; they gradually enlarge at one end, and become shorter, each rod forming an almost round spore. The subsequent germination of these spores or cocci was also followed most satisfactorily; their contents formed into a rod which emerged from the spore, the empty case being left behind, or in some cases it remained for a time attached to the end of the full-grown rod.

Most of the specimens described are from America; one species is recorded from Liberia, in Africa; and Zukal has recently found in Vienna four species of *Chondromyces* identical with those discovered by Thaxter; he has also described one new species—*Myxococcus macrosporus*.

The specimen I have had under observation grew on some pellets of rabbit-dung on which I was watching from day to day the development of *Dictyostelium*, one of the near allies of the *Myxobacteria*. The pellets were gathered, on account of their very mouldy appearance, at Llanwymawddwy, in Merionethshire, towards the end of the long dry season of 1899. They were put away in a dry place for several weeks, then moistened and kept in a damp atmosphere. Numerous fungi soon made their appearance, and in due course the cysts of what I now know were *Myxobacteria*. They looked exactly like the minute perithecia of some species of *Nectria*; they were of a bright pinkish-orange colour, and grew in large numbers over the pellets. They were easily distinguishable with a small-power field-glass. A closer microscopic examination showed that the perithecia-like bodies were formed entirely of micrococci that were colourless when dispersed; there was no trace of fungal hyphæ, and they could only be bacteria. I tried to cultivate the cocci in a hanging drop of sterilized decoction of the pellets, without success. Tube-cultures were also tried with a mixture of the decoction and gelatine, and these resulted in small spherical colourless colonies distributed in the gelatine after a few days, On examination these were seen to be formed of actively motile rods. An attempt was made to cultivate some of the bacteria from the colonies on carefully sterilized pellets, and so establish a relation between the different forms; but this was, for unknown reasons, also unsuccessful. The coloured cysts first observed had disappeared meanwhile, and the whole matter was laid aside.

In the *Naturalist* for November, 1900, I observed a reference by Mr. Massee to Prof. Thaxter's work on *Myxobacteria*, and recognized the nature of the cocci. I have no longer any doubt that the motile rods in the culture-tubes were a stage of the encysted cocci. The species differs in form and colour from the members of the genus already described, and is therefore an addition to the growing numbers of *Myxobacteria*.



Myxococcus pyriformis.—A. Cysts magnified about 50 diameters. B. Cocci from the cysts. C. Rods from the colonies in the culture-tubes, both magnified 2400 diameters.

Myxococcus pyriformis, sp. n. Cysts scattered, pear-shaped, minute, varying in size, about ¼ mm. in height, bright pinkish-orange-coloured, on a short transparent gelatinous stalk composed of cocci which are irregularly round or somewhat oval, 1–1·5 μ in diameter, or 2 × 1·5 μ; colonies in the culture-tubes colourless or dirty white, formed of motile rods varying in length up to about 3 × ·8 μ.

I have to thank Mr, Blackman for his valued advice and assistance during the progress of my investigation. The work was carried out in the Botanical Laboratory of the British Museum, and stained slides of the cocci and rods are placed in the Herbarium.

SHORT NOTES.

Viola tricolor L. var. nana DC.—The specimens mentioned by Mr. E. G. Baker as from Scilly are doubtless identical with the Channel Isle specimens. They are from Tresco, May, 1886 (*W. Curnow*); St. Martin's, June, 1877 (*J. Ralfs*). Mr. Curnow labelled the specimens "*V. Curtisii.*" It was also distributed from St. Brelade's Bay, Jersey (*Rev. A. Ley*), named by Mr. Lloyd (Exchange Club Report for 1885, p. 124 (1886)). I have it also from Mr. Andrews's station, gathered by Miss Dawber in 1894; also from Grand Havre, Guernsey, 1890, by the same lady. The plant is fully described by Mr. N. E. Brown in Eng. Bot. Supp. ed. 3, p. 32. Another interesting form of *tricolor* is that named by Mr. Lloyd "*V. confinis* Jordan, *V. Provostii* Bor." (Ex. Club Report, *l. c.*). It was gathered at Ecton, in North Staffordshire, by the Rev. W. H. Purchas. This has much the facies of *lutea*, but the colour is paler, and the growth that of *tricolor*. It is greatly to be desired that Mr. Baker will follow up the study of these plants, as there are several wanting names, and I trust that all who can will send him material. An interesting form occurs at Sheringham, Norfolk, which I have been unable to identify; I hope Mr. Baker will do so.—Arthur Bennett.

A Suffolk Note.—Accompanying specimens of *Lycopodium* in Petiver's Hort. Sicc. Angl. (Herb. Sloane, 150, fol. 46) is a note by Adam Buddle which may be worth transcribing, as it mentions a local botanist unknown, so far as I am aware, to fame. Buddle's visit to Lothingland is referred to in this Journal for 1881 (p. 55) by R. A. Pryor, who thought that it probably took place during Buddle's residence at Henley, Suffolk, about 1697. This seems to be confirmed by his note as to *Lycopodium clavatum*, which is interesting, as the only locality recorded for the plant in the *Flora of Suffolk* is Tuddenham Heath, which is not very distant from Henley, and which is also a locality for *L. inundatum*, the "creeping Clubmoss" mentioned by Buddle. The note (which is not dated) runs:—"I found y^e Muscus clavatus on a heath near me but very sparingly y^t being y^e onely head I found. The other creeping club moss I found abundantly on a boggy place on a heath in y^e Isle of Lovingland [Lothingland] y^e best place for simpling in Suffolk. I there found Sium alterum Olusatri facie [*Cicuta virosa*], Asplenium sive Ceterach, Equisetum nudum G. asperum [*E. hyemale*], Lathyrus viciæformis &c [*L. palustris*], Eryngium vulgare seu mediterraniū [*E. campestre*], with other rare plants tho no strangers to you, in y^e^ company of one Mr. Barker of Beccles an industrious botanist who without banter knows to a yard square of ground where every rare plant of y^e^ Island grows, having search'd it for these severall years past."—James Britten.

The Box in Britain.—Dunstable is mentioned as a locality for Box on p. 29. The Box grows apparently wild on the chalk downs near Ashridge and Berkhampstead, some six or seven miles from here. I believe there are some old trees, but I have not been for some years. Near by, at the foot of the chalk hills, is Boxmoor. The Ashridge Hills are geologically similar with the Box Hill of the South Downs. The local name near Ashridge and Ivanhoe is "Box Hill." The Box district here is chiefly in Hertfordshire, although the Box is not included in Mr. R. A. Pryor's flora of the county. There is a place in Beds on the top of Dunstable Downs (chalk), about four miles from here, near Whipsnade, named Boxstead, the local pronunciation of which is Buck-stead. There is a place named "Boxe" in Domesday Book for Herts, sect. xxviii.; I see by maps that this was in S. Beds or N. Herts, as Boxe is associated with Craulai and Westone (Crawley and Westoning) in S. Beds, and Offelei (Offley), close by, in N. Herts. At the latter place there are chalk hills with woods, identical with the hills and woods where the Box now grows near Ashridge and Berkhampstead, but whether Box occurs on these hills now I do not know. Chauncy, *Historical Antiquities of Hertfordshire*, vol. ii. p. 126, 1826, identifies the Boxe of Domesday with Box and Boxbury, and says:—"This was a Vill or Parish, which was scituated between the Parishes of Stevenage, Chivesfield, and Walkerne; there was anciently a Church to the same, which was erected in a Field on the Hill near the Woods, now called the Church-yard, where the Foundations may be seen; and this Parish was called Box from a great wood, which retains this name to this day." On p. 128 he refers to Boxbury:—"As to the other Moyety of this Mannor, and Tythes of Boxbury King H. VIII granted them," &c. Two miles S.E. of Boxwood is *Box Hall*. In vol. i. p. 43, under Pipe Rolls of Edw. I., the personal names of Ralph Boxted and Ralph de Boxted, 1288, occur. The place-name Boxstead occurs on Dunstable Downs. In Chauncy's Map of Herts, 1700, he gives the place-name *Box*, not Box-wood, two miles E. of Stevenage. A farmer here, from Pirton, N.W. border of Herts, says there is a Box-orchard there with large box-trees. I have noticed that Box is pronounced *bux* by the rustics. Other Latin forms occur in this district, as the *comp* (the plain)—a field called Campum-downum or dunum (= field at base of down), &c. The six-inch Ordnance map is very inferior to the old one-inch, for place-names.—W. G. Smith.

Mosses of North-east Yorkshire, "V.-C. 62" (Journ. Bot. 1900, 484–9).—I am much obliged to Mr. Cocks for pointing out a mistake in this paper. It arose from a persistent idea I have had for some time that the "Ainsty" was in N.E. Yorkshire. Having had only a short time in which to prepare the paper, I unfortunately omitted looking at my vice-county boundaries, or the mistake might have been avoided. Mosses from the following places mentioned in the paper should be transferred to v.-c. 64:—Askham Bog, Moormonkton, Hammerton, Healaugh, Appleton Roebuck, Thorparch, Boston Spa, Colton, Bolton Percy, Tockwith, Hessay—all of which are in the Ainsty of York. Mosses from Leckby Carr should be transferred to v.-c. 65.—WM. INGHAM.

RUBUS CRINIGER Linton IN SOMERSET. — In September, 1894, I collected by a roadside near Oare, in West Somerset (v.-c. 5), a bramble which I could not name. A few days ago I examined the specimens again, and, still feeling uncertain, took them to Mr. Rogers, who tells me that they are *R. criniger* Linton. This makes a new "county record," and considerably extends the known distribution of the species.—R. P. MURRAY.

NOTICES OF BOOKS.

Genera Muscorum Frondosorum, Classes Schistocarporum, Cleistocarporum, Stegocarporum complectentia, exceptis Orthotrichaceis et Pleurocarpis. Gattungen und Gruppen der Laubmoose in historischer und systematischer Beziehung, sowie nach ihrer geographischen Verbreitung unter Berücksichtigung der Arten. Handschriftlicher Nachlass von Dr. CARL MÜLLER. Mit einem Vorworte von Dr. KARL SCHLIEPHACKE. Leipzig: E. Kummer. 1901. Preis 12 M. Pp. viii, 474.

NEARLY two years have elapsed since the death of the renowned moss-specialist Carl Mueller on February 9th, 1899. Born on December 16th, 1818, and actively pursuing his studies to the last, this indefatigable worker found the generous allotment of nearly eighty-one years insufficient to enable him to complete his life's vocation.

In the sympathetic preface with which Dr. Schliephacke introduces this last fragment of his old friend's work, he gives us some interesting data of Carl Mueller's career—how he discovered his first new moss (*Sphagnum molluscoides*) so long ago as the year 1840; how he began the publication of that classical work, the *Synopsis Muscorum Frondosorum* in 1847 and finished it in four years. The two volumes contain nearly 1600 pages, and added 473 new species to bryological science. Before issuing his *Synopsis*, Carl Mueller had already published twenty-five bryological papers, and since its completion he has added eighty more, three of which have appeared since his death. These contributions are to be found in all sorts of periodicals and books of travel. In 1853 was produced his *Deutschlands Moose*, a volume of 512 pages. Nor did his literary activity cease here, for during a number of years he was concerned in the editorial management of the *Botanische Zeitung* and *Die Natur*. What the sum total of the new species he described may be it is impossible to say with any approach to accuracy; but six or seven thousand is probably a moderate computation. He certainly published some two thousand after 1895, presumably urged on by the genesis of General Paris's *Index Bryologicus;* moreover, some hundreds of *nomina nuda* are put into circulation in the present work.

He contemplated, Dr. Schliephacke tells us, the publication of a third volume of his *Synopsis*, and began to prepare the requisite material more than ten years ago; but the uninterrupted supply of new gatherings of mosses from all parts of the world which reached him kept him so fully occupied that he was never able to execute his project. And so that new or revised synopsis of the world's mosses, which is so badly needed and which he, from his complete mastery of the subject, was so thoroughly competent to provide, still remains unwritten. It is true that, so far as the acrocarpous mosses are concerned, some degree of consolation may be found in the present fragment, upon which he was engaged in his last years. The pity is that the pen was snatched from his failing hand when the task was but half completed. However, as far as it goes, it is an exposition of his views as to the proper grouping of the genera and subgenera, conveying an adequate description of the morphological characteristics of the various groups, genera, &c., and of their historical development, and a skilful account of the geographical distribution of the species, the whole being interspersed with critical and sagacious remarks which both add to the interest of the text and reveal the profundity of the author's knowledge and his wonderful grasp of the subject.

The system adopted is an amplification of that which was expounded in the *Synopsis* fifty years ago. The Cleistocarpous mosses are retained in a class by themselves. The *Sphagnaceæ* maintain an artificial position in contiguity with the *Leucobryaceæ*. The genera are far fewer and more condensed than in rival systems of classification; thus *Campylopus* is but a subgenus of *Dicranum*. The number of genera treated is about 115, and seven of these bear a superficial resemblance to novelty which in some cases is misleading. For three of them (*Beckettia*, *Thysanomitriopsis*, and *Hypodontium*) will not withstand the test of research. They have already been described in *Hedwigia*. Two of the others, *Brothera* and *Monocranum* (both Dicranaceous), were baptized in Kindberg's *Enumeratio Bryinearum Exoticarum* in 1891, but now are described for the first time. And as for the remaining two, *Spruceella* and *Aulacomitrium* Broth. (both Pottiaceous), they labour under the disadvantage of being fitted with names which are open to strong objection. *Sprucella* Steph., which barely differs from the former name, has been in use in the Hepatics since 1886. And, as to the latter, it must give way, if the Macromitrious *Aulacomitrium* Mitt. (1891) is a sound genus.

It is much to be regretted that no references are given to the first place of publication of the subgenera, as they would have been very welcome. Those of the genera, however, are supplied, but are not always satisfactory. For instance, *Phascum*, *Ephemerum*, and *Astomum* are referred to "Hampe *Linnæa* 1832." But I have never been able to find this reference. Pfeiffer, in his *Nomenclator Botanicus* (1873), is unable to quote the page. It is true that Schwaegrichen, in the text to his tab. 301, *b* (Spec. Musc. Frond. (1842)), refers these genera to Hampe, "in diario Schlechtendaliano anni 1832, p. 522"; but, if this journal means *Linnæa*, then the reference is a myth. On the other hand, Hampe broke up the genus *Phascum* L. in a moss-list published in *Flora*, 1837, p. 285; and *Astomum* and *Ephemerum* have the aspect of being printed there for the first time. Schwaegrichen's quotation requires explanation. The species he quotes are not in every case allocated to the same genus as in Hampe's list of 1837.

A. G.

Botany: an Elementary Text for Schools. By L. H. Bailey. 8vo, pp. xi, 355, 500 figs. The Macmillan Company: New York. 1900. Price 6s.

Another delightful book from Professor L. H. Bailey, recalling in its wealth of illustrations and general air of excellence his *Lessons with Plants* reviewed in this Journal for 1898 (p. 200). The *Lessons* was to supplement the work of the teacher; the new book is made for the pupil. But the teacher should read and mark the paragraphs addressed to himself in the form of an introduction; a series of sentences replete with common-sense advice. The author has studied his pupils as well as the plants, and aptly hits off the relations which should subsist between them. The secondary teacher, he reminds us, has not to train scientific observers, but to educate the child, to bring him closer to the things with which he lives, to widen his horizon, and intensify his hold on life. Botany should not be taught for the purpose of making the pupil a specialist: that effort should be retained for the few who develop a taste for special knowledge. Such a one should be encouraged. There are colleges and universities in which he may continue his studies. But, while the ninety and nine cannot, and should not, be botanists, every one can love plants and nature.

Professor Bailey traces four epochs in the teaching of elementary botany—(1) The effort to know the names of plants, and to classify. (2) The desire to know the formal names of the parts of plants, an outgrowth of the study of gross morphology when botanies came to be dictionaries of technical terms. (3) The effort to develop the powers of independent investigation; a result largely of the German laboratory system, which emphasized the value of the compound microscope and other apparatus. "This method is of the greatest service to botanical science, but its introduction into the secondary schools is usually unfortunate"—a statement which will be thoroughly endorsed by every one who has witnessed the results by examination and otherwise of the attempt. (4) The effort to know the plant as a complete organism, living its own life in a natural way. This epoch started with the appearance of Kerner's work on Plant-life, but it is to the New World and to men like Professor Bailey that we owe its appreciation and the development of what is at once a rational method of study and at the same time one that is attractive to young pupils.

The book is arranged in four parts. The subjects are—the nature of the plant itself; the relation of the plant to its surroundings; histological studies; and determination of the kinds of plants. Each is practically a distinct subject, and the teacher may begin where he will. If he is wise, he will begin at the beginning.

Part i.—The Plant Itself—occupies more than half the book. It consists of twenty-five short chapters, dealing with the general structure of the plant, its parts, and the parts they play in the life-processes. The text is paragraphed, and the author makes a free use of differences in type to emphasize axioms and other points of importance. The pictures are good, plentiful, and apropos, but the pupil is continually referred to actual plants with which he is, ought to be, or may easily become acquainted. The short review at the end of each chapter is a searching cross-examination between teacher and taught, and may be extended indefinitely. We note that the author occasionally departs from generally accepted use of terms—as, for instance, when he defines bracts as "much reduced leaves" including leaf-bud scales, or uses corymbose as practically synonymous with an indefinite inflorescence, or refers to the groups of sporangia on fern-leaves as "fruit-dots." We should prefer, where terms have crystallized out, to retain them, so long as they are useful and not misleading, in their generally received meaning.

Part ii.—The Plant in its Environment (pp. 197–232)—contains five suggestive and attractive chapters enhanced by a series of very nice photographs of landscape, plant-associations, &c. Part iii.—Histology, or the Minute Structure of Plants (pp. 233–274)—is advisedly brief; it contains directions for microscopic work, and a short account of the general anatomy of stem, leaf, and root. The terms endogenous and exogenous as contrasting the mode of growth in the stem of a monocotyledon and dicotyledon might well be expunged from elementary works, as they have been from all up-to-date advanced text-books. Part iv.—The Kinds of Plants (pp. 276–340)—contains directions for making a collection, and an account of twenty-five important families with their commoner genera and species arranged on the plan of a flora. At the end is an index and glossary, which seems to have been carefully prepared. One would like to think that children in our own country had the chance of learning about plants on Professor Bailey's plan.

A. B. R.

ARTICLES IN JOURNALS.[*]

Annals of Botany (Dec.) — A. H. R. Buller, 'Physiology of Spermatozoa of Ferns.' — W. A. Murrill, 'Development of archegonium and fertilization in *Tsuga canadensis*.' — A. Howard, *Trichosphæria Sacchari*. — E. Sargant, 'Transit from stem to root in vascular system of seedlings' (1 pl.).—Id., 'Fertilization in Angiosperms.'—W. Wallace, 'Stem-structure of *Actinostemma biglandulosa*' (1 pl.).—F. F. Blackman, 'Primitive Algæ and Flagellata.'—W. C. Worsdell, 'Affinities of *Bennettites*.' — I. B. Balfour, 'Richard Spruce' (portr.).

Bot. Gazette (20 Dec.). — R. W. Smith, 'Achromatic Spindle of *Osmunda*' (1 pl.).—E. M. Chamot & G. Thiry, 'Chromogenic Bacteria.' — J. M. Van Hook, 'Division of cell and nucleus in Liverworts' (1 pl.). — M. W. Doherty, *Trimmatostroma abietina*, sp. n.— W. R. Maxon, *Asplenium ebenoides*.

Bot. Zeitung (16 Jan.). — L. Jost, 'Ueber einige Eigenthümlichkeiten des Cambium der Bäume' (1 pl.).

Bull. Torrey Bot. Club (29 Dec.).—C. H. Peck, 'New Fungi.'— P. A. Rydberg, Rocky Mountain *Compositæ*.[†] — W. R. Maxon, Pteridophyta of Alaska. — A. Zahlbruckner, 'Zur Flechten-Flora Süd-Californiens.'—E. G. Britton, 'Bryological Notes.'

Gardeners' Chronicle (19 Jan.). — E. A. Bowles, '*Crocus marathonisius*.'—(19, 26 Jan.). A. Worsley, 'Hybridization in *Amaryllea*.'

Journal de Botanique "Juillet 1900"; received 10 Jan.).— P. Van Tieghem, *Pentaphyllax* et *Corynocarpus*. — E. Perrot, 'Organes appendiculaires des feuilles de *Myriophyllum*.'—A. Finet, 'Fleur anormale de *Cypripedium*' (1 pl.). — C. Bernard, 'Sphères attractives chez *Lilium candidum*, *Helosis*, etc.' (2 pl.).

Oesterr. Bot. Zeitschrift (Jan.). — L. Linsbauer, 'Bemerkungen über Anthokyanbildung.' — H. & P. Sydow, 'Zur Pilzflora Tirols.' —J. Velenovsky, 'Achter Nachtrag zur Flora von Bulgarien.'— V. Kindermann, 'Ueber das sogennante Bluten der Fruchtkörper von *Stereum sanguinolentum*.'

Rhodora (Dec.). — R. G. Leavitt, 'Polyembryony in *Spiranthes cernua*.'—M. L. Fernald, 'Northeastern Thalictrums' (1 pl.).—Id., '*Scirpus maritimus*.' — C. B. Graves, 'Early growth of *Impatiens biflora*.' — B. L. Robinson, 'Nomenclature of *Agrimonia*.' — H. Webster, '*Tricholoma portentosum*.' — (Jan.). G. E. Davenport, '*Asplenium ebeneum* var. *Hortonæ*' (1 pl.). — J. M. Greenman,

---

[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

[†] A note on *Sideranthus* in this Journal for 1899, p. 483, might have been referred to in this paper.

'*Senecio* in New England.'—A. W. Evans, '*Fossombronia salina.*'—B. L. Robinson, '*Gnaphalium plantaginifolium* Linn.' — M. L. Fernald, '*Monarda fistulosa.*'

BOOK-NOTES, NEWS, &c.

We have just received Part xx. of Dr. Braithwaite's *British Moss-Flora* (London: 26, Endymion Road, Brixton Hill. Pp. 97–128; tt. ciii–cviii. Price 6s.), and we observe with pleasure the notice that three more parts will finish the work. The present instalment contains descriptions of twenty-seven species, and illustrations of thirty. It treats of the three remaining species of *Rhynchostegium*, and the sections *Brachythecium* (thirteen species) and *Pleuropus* (three species), thus bringing us to the end of the genus *Hypnum*. Then follow four small genera—*Lesquereuxia* and *Isothecium* with four and two species respectively, and *Pterogonium* and *Pterygynandrum* with one apiece. *Camptothecium* will be found united with *Homalothecium* under the section *Pleuropus;* and in *Lesquereuxia*, Lindberg's emendation of *Lescuræa* Br. et Sch., are included *Ptychodium* and *Pseudoleskea*.

Although not strictly a botanical book, the *Practical Guide to Garden Plants*, which Mr. John Weathers has prepared and Messrs. Longman have published in a handsome guinea volume, has more claims to be so considered than most of its kind. The arrangement of the descriptive portion of the work is systematic, the sequence of the orders usual in British books being followed; and the descriptions themselves, so far as we have tested them, are accurate, and are couched in language intelligible to any one of ordinary education. Besides a full glossary and a sketch of the life-history of plants, there are descriptions of flower, fruit, and vegetable gardens, useful lists of plants grouped under different headings, plans for arrangement, work, etc.—in fact, everything that the amateur gardener needs. Except in the glossary, there are no illustrations—a fact which we do not regard as altogether a drawback in these days when popular books are loaded with indiscriminate and often unsuitable figures. There is a good index of the plants described, which makes up for any inconvenience that might be felt by those unfamiliar with the systematic arrangement adopted.

It may be noted that *Keble's Parishes*, by the veteran Anglican novelist Miss Charlotte Yonge, published by Messrs. Macmillan in 1898, contains a long list (pp. 205–234) of the flowering plants of Hursley and Otterbourne, the Hampshire parishes in question. Miss Yonge has written about wild flowers before in *The Herb of the Field*, a pretty little book published anonymously in 1858. On the present occasion it is much to be regretted that she did not submit her list to some botanist for revision. The few names of orders given seem to have been dropped in at random, so little do they correspond with the plants placed under them; and occasionally the text has got misplaced, as when *Vicia sepium* is described as "a brilliant little red flower"—a remark clearly belonging to *Lathyrus Nissolia*, which stands next in the list.

The Flora of Staffordshire, on which Mr. J. E. Bagnall has been engaged for some years, will be issued as a supplement to this Journal. It will be paged continuously for the convenience of those who may wish to bind it separately. The first instalment appears with our present issue.

The first two numbers (Nov. and Dec. 1900) have reached us of *The O. S. U. Naturalist*, published by the Biological Club of the Ohio State University. The editor for botany is Mr. F. J. Tyler, B.Sc.; the botanical articles in the numbers before as are mostly by Mr. W. A. Kellerman.

Mr. Frederick Townsend is anxious to obtain, either by exchange or payment, specimens of *Euphrasia* from Austria, Italy, and Spain. His address is: Aldworth, Haslemere.

Messrs. Linton have just issued the Sixth Fascicle of their *Set of British Hieracia.* "in completion of (their) original design and undertaking." It is hinted that a supplementary fascicle of forms not yet represented in this set may be brought out in course of time. A selection from the notes accompanying the fascicle, which largely consists of forms believed to be endemic, will appear in our next issue.

Mr. A. B. Jackson contributes to the *Transactions* of the Leicester Literary and Philosophical Society (vol. v., October, 1900) some "Notes on the Botany of the Beaumont Leys Sewage Farm" near Thurcaston, in that county.

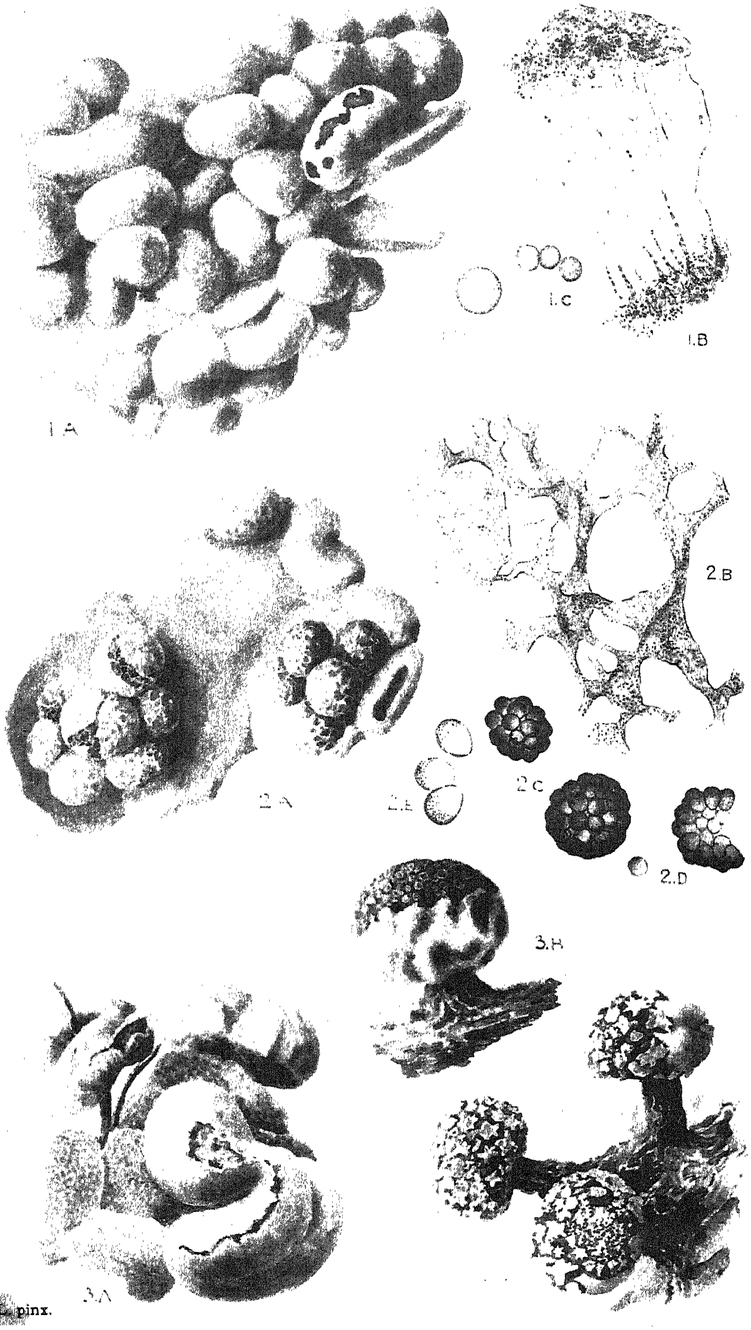
We regret to announce the death of Dr. J. G. Agardh, of Lund, of whom we hope to publish a notice in our next issue.

No. 4 of *Notes from the Botanical School of Trinity College, Dublin*, issued in January, contains notes "On the first mitosis of the spore-mother cells of *Lilium*" (with two plates), and others on *Marchantiaceæ*, *Arum italicum*, *Cuscuta reflexa*, and *Drosera rotundifolia*, by Dr. H. H. Dixon; notes on Algæ and on 'bletting,' by Prof. Perceval Wright; and a memoir of G. J. Allman.

To Sir W. T. Thiselton-Dyer.—With reference to the editorial notes contained in the *Journal of Botany* for January, 1901, pages 47 and 48, reflecting on you and your work in connection with the preparation of the *Flora of Tropical Africa*, I desire to offer to you an expression of my sincere regret for the same. The preparation of the *Flora of Tropical Africa* was not committed to you until the year 1891, and my statement that it has been in your hands since 1872 is incorrect. I sincerely apologize to you for having imputed to you unnecessary delay in its preparation, and I desire to withdraw all reflections and imputations affecting you of every kind whatever contained in the editorial notes referred to.

James Britten.

Tab. 419.



G. L. pinx.

NOTES ON MYCETOZOA.

By Arthur Lister, F.R.S.

(Plate 419.)

Badhamia versicolor, n. sp. (Pl. 419, fig. 2). Mr. W. Cran, whose extensive gatherings of Mycetozoa in the West Indies are recorded in this Journal for 1898, pp. 113–122, has discovered in the neighbourhood of Rhynie, Aberdeenshire, a *Badhamia* which appears to have been hitherto undescribed. The general characters of the species are as follows:—Plasmodium? Sporangia sessile, subglobose, 0·3-0·5 mm. diam., pure grey or grey with a tinge of flesh-colour, scattered or in small groups; sporangium-wall hyaline, with innate clusters of lime-granules, the lime sometimes scanty or wanting; columella none; capillitium a coarse network of broad or narrower bands densely charged throughout with lime; in some sporangia the granules contained in the capillitium are white, in others apricot-coloured; spores ovoid or somewhat cuneate, arranged in clusters of from ten to forty or more, purple-brown and minutely warted on the broad end, pale and smooth elsewhere, 10 × 8–12 × 9 μ diam. Hab. on lichen and moss on tree-trunks.

The unbroken sporangia vary slightly in tint, as described above; when the sporangium-wall is ruptured and the spores are dispersed, the contrast between those containing apricot capillitium and those with white is very marked, and suggests the specific name adopted. The prevailing colour is grey; thus, in a superficial examination of 495 sporangia, 300 were classed as grey, and 195 as apricot; occasionally the lime is almost or entirely wanting in the white capillitium, but this is exceptional. The spores differ from those of any other species of the genus I am acquainted with; the large clusters take the form of hollow spheres, and the spores resemble in their arrangement the drupes of a ripe raspberry; they are remarkably translucent, and are but faintly tinted except on the side turned towards the surface of the sphere (Pl. 419, fig. 2 *c*, *d*). The habitat is also different from that chosen by other members of the group. Mr. Cran describes the sporangia as being found breast-high and upwards on most of the trees in his neighbourhood that have lichen and moss on the trunks; below this level they have seldom been met with. The specimens we have received are on yellow and grey lichen, principally on *Physcia parietina*; some are on moss (*Orthotrichum*). Mr. Cran first gathered the species in Sept. 1899; since that time it has frequently come under his notice; in Sept. 1900, he speaks of it as being "in tolerable abundance on elder, elm, ash, &c., but very difficult to distinguish."

B. versicolor appears to be allied on the one hand to *B. hyalina*, and on the other to *B. nitens*; considering the minute size of the sporangia, and their similarity in colour to the lichen on which they rest, it is not surprising that the species has until now escaped notice. Mr. Cran has searched for the plasmodium, but hitherto without success.

Badhamia foliicola List. Dr. E. Jähn, of Berlin, has sent me a specimen of this species gathered at Jungfernheide, near Berlin, in July, 1900. He describes it as frequently appearing after heavy rains with orange plasmodium on grass and dead leaves in woods. It corresponds in all respects with the abundant growths in Wanstead Park in the autumns of 1896 and 1898, and at Lyme Regis in 1897, already recorded (Journ. Bot. 1899, 145). In September, 1900, Mr. James Saunders found *B. foliicola* among straw in a stack-yard at Chaul End, near Luton; it was limited in quantity, but is identical in character with the original type. The species has now been obtained from four localities.

Badhamia ovispora Racib. Miss Hibbert-Ware adds another station for the occurrence of this *Badhamia;* it appeared in May, 1900, in considerable quantity on stable-manure in a cucumber-house at St. Margaret's School, Bushey, Herts. Mr. Saunders gathered it plentifully in September, 1899, in a stack-yard at Stopsley, near Luton, where it had been obtained in July, 1897, as before recorded (Journ. Bot. 1897, 354; 1898, 161).

Badhamia lilacina Rost. As the habitat of this species is given by most authorities as being on rotten wood and bark, it may be interesting to record the localities from which the gatherings that have come under my notice were obtained. In September, 1891, Miss G. Lister came upon a mass of bright yellow plasmodium on Sphagnum in a wide moor at Pilmoor, Yorkshire; the moss was carefully gathered and placed in a basket, in which it was carried to London next day; on reaching home, a perfect development of *Badhamia lilacina* sporangia, many hundreds in number, had taken place. In August, 1896, Mr. Saunders found bright yellow plasmodium on Sphagnum in a swampy wood at Flitwick, Beds; perfectly formed sporangia with characteristic capillitium and spores of *B. lilacina* were produced from this growth. In September, 1899, some members of my family were travelling in Scotland, and noticed yellow plasmodium on Sphagnum on an open moor near Arisaig; careful protection was used, resulting in the formation of typical sporangia of the species. There is a specimen of *B. lilacina* in Greville's herbarium at Edinburgh, but we have no other record of this species having been collected in Britain previous to the Pilmoor gathering.

Physarum calidris List. In August, 1900, I received from Mr. D. MacAlpine, of the Department of Agriculture, Melbourne, Victoria, a specimen of *P. calidris* found on dead plum-leaves. I am not aware that it has before been recorded from Australia. The capillitium consists of a network of broad bands charged with lime, associated with numerous slender threads; the stalks are translucent, of the usual red-brown colour.

Physarum contextum Rost. Mr. Cran gathered this species near Rhynie in Oct. 1900. It is the orange-coloured form marked in De Bary's collection at Strassburg "var. *splendens*." The upper sporangium-wall is brittle, and there are vitreous flakes intermixed with the granular substance such as are found in *P. conglomeratum* but rarely in *P. contextum*; the spores measure 11 μ, and are of typical colour and roughness.

PHYSARUM DIDERMA Rost. Mr. J. Jackol has sent me a specimen of this species from the State of Washington; it is the first time we have seen an example of it from the United States. The sporangia are long plasmodiocarps, and the outer calcareous layer of the sporangium-wall is in several parts reflexed from the persistent membranous inner layer, a feature which is one of the distinctive characters of the species. The gathering corresponds in all respects with the English type.

PHYSARUM CRATERIACHEA List. An account of a large gathering of this species at Wardour Castle in August, 1895, was given in this Journal for 1895, p. 323, where reasons were advanced for suppressing the generic name *Crateriachea* given by Rostafinski, and placing the species in the genus *Physarum*. Since the date of that notice *P. Crateriachea* has twice been found in the neighbourhood of Luton; Mr. Saunders gathered it on straw in a plantation at Chaul End in September, 1899, and again in July, 1900. On both occasions there was a plentiful crop of precisely the same form as that obtained at Wardour Castle. In December, 1899, I received from Mr. R. E. Fries, of Upsala, specimens of a gathering he had made at Frostviken, Jamtland, Sweden; they corresponded essentially with our English examples and with the type in the Strassburg collection. The sporangia were scattered, some nearly sessile, others on short or longer stalks; the stalks did not contain lime, except where the apex expanded into the large conical or ovoid-oblong columella, which was densely charged with white lime-granules. The capillitium in the outer part consisted of delicate anastomosing colourless threads, with scattered small white lime-knots; near the columella the threads were coarser, and contained numerous brown membranous expansions such as we see in imperfect developments of other species of *Physarum*; the spores averaged about 8 μ diam., intermixed with others of abnormal size. The points in which the Swedish specimen differed from the former gatherings were the more globose sporangia and the character of the sporangium-wall, which was almost entirely destitute of lime, and often iridescent. The columella was sometimes replaced by scattered lime-knots, but this feature occurs in the English specimens.

PHYSARUM GULIELMÆ Penzig. In Oct. 1899, I received from Dr. Ph. Trilling, of Berlin, a specimen gathered by him near Kiel, which we place under this name. It corresponds with that sent by Mr. R. E. Fries from Upsala, previously described (Journ. Bot. 1899, 147). It is allied to *P. virescens* Ditm., but appears to be specifically distinct, notably in the white lime-knots of the capillitium. With the exception of Prof. Penzig's type from Java, we know of no other record of its occurrence.

PHYSARUM DIDERMOIDES Rost. var. LIVIDUM List. During the years 1899 and 1900 Mr. Saunders has repeatedly found this form in the stack-yards near Luton; the characters described in the former notice (Journ. Bot. 1898, 161) are quite constant.

PHYSARUM STRAMINIPES List. In August, 1899, Mr. Cran supplied me with a typical specimen of this species found on straw near Rhynie, and on Dec. 30th, 1900, I gathered it on dead leaves by the roadside at Lyme Regis; in the same month Miss Hibbert-Ware obtained it, also on dead leaves, at Clevedon. *P. straminipes* has now been recorded from Bedfordshire, Dorset, Somerset, Norfolk (where it was collected by Mr. Burrell, of Sheringham, in October, 1898), and from Scotland; the characters given in the first description of the species (Journ. Bot. 1898, 163) are constant in all the specimens received from the various localities.

FULIGO ELLIPSOSPORA List. I am indebted to Mr. Saunders for several fine specimens of *F. ellipsospora*. The combined sporangia form compact æthalia from one to two inches long, and about a quarter of an inch broad; they are pure white, with a smooth cortex; the spores are of the typical ellipsoid shape, and measure 13 × 9–10 μ diam. It is the form we receive from America, but has not before been recorded from this country. Mr. Saunders found the æthalia on straw and twigs in a stack-yard on Stopsley Common, near Luton, on September 9th, 1899. On comparing this gathering with that by Miss Fry in 1898 (Journ. Bot. 1899, 148), there is a striking difference, as in the latter specimen the sporangia do not form a compact æthalium, and the spores are nearly spherical; in the capillitium and in other respects they closely agree, and we do not doubt that they are both the same species.

FULIGO OCHRACEA Peck. In a previous notice (Journ. Bot. 1899, 148) I referred to a specimen received from Mr. Fries, of Upsala, as being the first recorded European example of *F. ochracea*. I am now able to report a second gathering, On September 22nd, 1899, a lobed mass of translucent apricot-coloured plasmodium was found on rushes growing amongst a cushion of *Polytrichum commune* on the open mountain-side of Aran Mawddwy, Merionethshire, about 1000 ft. alt. The rush-stems were carefully cut with a pair of scissors and laid on a bed of Sphagnum; they were brought home, a distance of two miles, and placed under a bell-glass. On the following day the plasmodium had collected in lumps from a quarter-inch to one inch in length, partly on the Sphagnum on to which it had crawled, and partly on the rush-stems. On September 24th the greater part had turned black; it was kept moist until the 26th, when it dried into inconspicuous ochraceous-olive æthalia; in one or two places the sporangia had not combined into a smooth æthalium, but retained their individuality in contorted clusters; the capillitium is almost *Badhamia*-like in character, and consists of large branching apricot-coloured lime-knots with a few connecting hyaline threads; the spores are purple-brown, minutely warted, and measure 10 μ diam. Except that the capillitium is more orange in colour, this gathering resembles that received from Mr. Fries in all respects.

TRICHAMPHORA PEZIZOIDEA Jungh. In Junghuhn's Java type the sporangia are discoid, or saucer-shaped, on long translucent red-brown stalks; the capillitium extends from wall to wall in branching and anastomosing strands, varying in thickness, with many broad expansions, which are free from lime, or, as Rostafinski expresses it, "the tubes are empty." The absence of lime in the capillitium was taken as one of the chief characteristics of the genus, and it was borne out by other gatherings from different parts of the globe. A specimen found in Java by Dr. Nyman in 1898 was not in accord with this definition; although in other respects agreeing with the type, the capillitium had the character of that of a *Physarum;* it contained numerous ovoid or fusiform knots densely charged with lime-granules, and connected by slender hyaline threads. In September, 1899, Dr. Jähn, of Berlin, kindly submitted to me for inspection a specimen which had been collected in German East Africa by Standt in 1897. In general features this also agreed with the type of *T. pezizoidea,* except that the capillitium consisted mostly of broad, branching, somewhat straight bands, charged throughout with lime, such as we associate with the genus *Badhamia;* a few rounded lime-knots connected by hyaline threads similar to those in Dr. Nyman's specimen were here and there present; the spores measured 15 μ, and were more strongly spinose than any of those described in the Brit. Mus. Cat. (p. 90). On a careful examination of the Sumatra specimen referred to on the same page of the Catalogue, the capillitium is found to be not entirely free from lime, but it is in such small quantity that it had previously been overlooked; in the Ceylon specimen, traces of lime can also be seen in the broad expansions of the capillitium-threads. Thus, in the eleven examples of the species that have come under our notice, four have more or less abundant calcareous deposits in the capillitium, while in seven the lime cannot be detected. When we consider how frequently we meet with limeless specimens of some species of *Physarum,* notably in *P. nutans,* the grounds for placing *T. pezizoidea* in a separate genus appear to be insufficient. We are dealing, no doubt, with a species of which we have only a few examples; but, judging from the material we possess, it takes its place in the genus *Physarum.* On comparing the Java and East African specimens with some examples of *Physarum calidris,* the resemblance of the two species to each other is striking; indeed, the principal difference seems to be in the larger size and saucer-shape of the sporangia in *T. pezizoidea,* and in the larger, darker, and more spinose spores.

CHONDRIODERMA SIMPLEX Schroet. (Pl. 419, fig. 1). In a former notice (Journ. Bot. 1895, 324) I described a species which I suggested might be *C. simplex* of Schroeter. The yellow-brown plasmodium was found on Sphagnum on a wild moor in Wales by Mr. Saunders, who collected and protected it until it changed to red-brown sporangia. In July, 1899, when rambling over an open common near Aberdeen, we came upon three patches of yellow-brown plasmodium, each about two inches across, on Sphagnum and heather, which at once suggested the Welsh gathering; a small part of the plasmodium was taken, and the rest left until the following day, when our patch was ripe and of a warm clay-colour; all the remainder was removed and kept in a moist receptacle, where it matured in the course of the next day. The crowded sporangia were irregular both in shape and size, varying from 0·3 to 0·7 mm. diam. They are somewhat hemispherical, but angular from mutual pressure. Although a fairly abundant crop, it was so inconspicuous among the brown heather and moss in its ripe state that, if the spot had not been well marked, it could scarcely have been detected. As in the case of *Badhamia lilacina*, before referred to, it is the bright colour of the plasmodium that catches the eye on the open moor. This gathering is identical with the specimen from Wales in almost every respect; the membranous sporangium-wall is beset, as in the latter, with clear brown round granules, and the very slender colourless capillitium is often beaded with scattered granules, but less so than in the Welsh specimen. The only difference between the two gatherings is the more ochraceous colour of the sporangia and the absence of an abundant hypothallus in the Aberdeen example, and this may be accounted for by the latter having matured under natural and undisturbed conditions; the spores are on the average rather smaller in the Scotch than in the Welsh specimen; they measure 8–9 μ as opposed to 10–12 μ diam., but, as they vary in different sporangia and exceptional spores attain to 13 μ, this difference can be of no specific importance. There is no question that they are both the same species; whether they are the same as Schroeter's *Chondrioderma simplex*, "with globose and solitary sporangia, growing on old stumps," cannot now be determined in the absence of the type. Since the above was sent to press, I have examined a specimen of this species received from Mr. H. Bilgram. He collected it on dead leaves and sticks in Fairmount Park, Philadelphia, Pa., in September, 1900. It resembled the gathering at Aberdeen in every respect, except that the round lime-granules in the wall and thickened base of the sporangia are lighter in colour; the specimen is consequently pale brown as seen under a 2 in. objective, or whity-brown—to use a familiar term which accurately describes it. The sporangia are crowded, of the same shape and size as figured in the plate; the spores measure 9 μ diam.

Chondrioderma Lyallii Mass. Mr. Fries has done me the favour to send a typical specimen of *C. Lyallii* obtained on herbaceous stems at Frostviken, Sweden, in September, 1899. Another good gathering was made by Mr. G. H. Fox, at 7000–8000 ft. alt., on a mountain near Saas, Switzerland, in June, 1899. The large sporangia vary in colour from white to ochraceous, and are seated on a white hypothallus, which in some cases is produced into a short thick stalk; the columella is generally broad and more or less hemispherical, but in some sporangia it is narrowly cylindrical, about 0·6 mm. long, and occasionally contracted and limeless in the upper part.

CHONDRIODERMA LUCIDUM Cke. A gathering of twenty-seven sporangia of this rare species was made on September 28th, 1900, at Llan-y-Mawddwy, Merionethshire. On the previous day bright yellow plasmodium just rising into fruit was observed on the under surface of a tuft of *Hypnum loreum* on the side of a rocky ravine. On the 29th the nearly globose sporangia had matured. They are lustrous rich orange in colour, and either sessile or on short dark brown stalks 0·1–0·3 mm. long; the capillitium is scanty, and consists of a coarse network of purple-brown strands, similar to that in Berkeley and Broome's original type of *Diderma lucidum* from Trefriw (figured in the Brit. Mus. Cat. Pl. xxxv.). The sporangium-wall is unusually translucent for one of the *Leangium* group, and in making preparations for the microscope in glycerine jelly, a yellow stain immediately flows out into the medium; the columella is obconic, and of a warm cream-colour; the spores are dark purple-brown, distinctly spinulose, 14–15 μ diam. This new gathering corresponds with the type in all essential particulars, and is interesting as confirming the integrity of the species, which before rested solely on the Trefriw specimen in which the remarkable capillitium suggested an abnormal development.

CHONDRIODERMA TREVELYANI Rost. Mr. J. Jackol, of Seattle, Wash., U.S.A., has sent me a number of specimens of Mycetozoa gathered in that neighbourhood during the last year; among them is one of *C. Trevelyani;* the sporangia are all expanded, the lobes of the sporangium-walls being reflexed in an irregularly stellate manner. A point of some interest attaches to this growth, as in several of the sporangia, but by no means in all, a small knot projects from the centre, corresponding with the drawing and description by Greville of the original type gathered by Trevelyan. He speaks of a "very small columella" being present. Berkeley saw the type, and wrote, "I find no trace of a columella; the bottom of the perithecium within is perfectly even." My own examination of what remains of Trevelyan's specimen and of eight others that have come under my notice confirmed Berkeley's view, but Mr. Jackol's gathering affords convincing evidence that Greville was right with regard to some of the sporangia now missing in the type specimen; at the same time, it is not a columella in the true sense of the word, but rather an excrescence, and is not always central.

DIACHÆA ELEGANS Fr. In June, 1900, Mr. D. MacAlpine sent from Melbourne a good specimen of *D. elegans.* He mentions it as occurring on several herbaceous plants, and it is probably not uncommon in the district. I am not aware of a previous record of the species having been obtained in Australia. It is the typical form which is found without variation in Europe, Asia, the Cape and Central Africa, and in North and South America.

DIDYMIUM DUBIUM Rost. Amongst the dense growth of creeping ivy that covers the wooded dell on the Undercliff at Lyme Regis where we first gathered this species in 1888, and at all times of the year when the locality has been searched, the flat sporangia are found in considerable abundance. Sometimes they are on the living ivy leaves, but mostly between the layers of wet and compacted dead leaves that have collected to some depth in sheltered hollows.

Didymium Trochus List. This species has abounded at intervals during the last eighteen months in the stack-yards at Chaul End and the neighbourhood. It was in great abundance when we visited the spot with Mr. Saunders in August, 1899; and he has since found it in still greater profusion, and writes that it is so common that he has now ceased to gather it. He has come upon the buttercup-yellow plasmodium not infrequently in the deeper layers of straw, and has sent us a quantity of it in a tin box that we might see its colour,—but it changed into sporangia in transit by post.

Lepidoderma tigrinum Rost. (Pl. 419, fig. 3). In the Brit. Mus. Catalogue reference is made to a sessile form of this species received from America, which bore a resemblance to a *Chondrioderma* in that the sporangia were smooth, of an ochraceous colour, and the sporangium-wall consisted of two layers, an outer one densely charged with minute angular granules of lime, and more or less closely adhering to a yellow membranous inner layer; in these respects they differed from the normal form, in which the sporangia are usually stalked, and the lime is deposited over the surface in more or less scattered vitreous disc-like scales. An interesting confirmation of the specific identity of the two forms was afforded by a specimen received from Dr. Sturgis, of New Haven, U.S.A., in June, 1897. It is a beautiful example of the typical stalked form, but in a few sporangia a deposit of crowded angular calcareous granules was present in narrow patches of a pale colour among the disc-like scales; this deposit extended in one sporangium over half the surface, producing an ochraceous outer wall corresponding with that of the sessile American specimens above described; the other half had the normal aspect with vitreous scales scattered over a dark ground; in short, we had in this sporangium, one side representing a *Lepidoderma*, and the other a *Chondrioderma* (Pl. 419, fig. 3 b). On September 24th, 1899, in a glen at Llan-y-Mawddwy, lemon-yellow plasmodium was observed on moss and *Jungermannia* on the wet vertical face of rock, and extending in scattered patches for about 100 yards along the side of a narrow path. Heavy rain fell on the three succeeding days, and during that time fresh plasmodium continued to make its appearance; it was carefully secured and brought in-doors, where it matured into sessile ochraceous sporangia of the *Chondrioderma* form already referred to. The sporangia were subhemispherical, or irregularly shaped plasmodiocarps, often ring-shaped round a leaf; the two layers of the sporangium-wall were either adherent, or more or less widely separated; the capillitium and spores were typical of *L. tigrinum*. Ring-shaped sporangia clasping the leaves of moss and *Jungermannia* are also of frequent occurrence in the American examples. Although the Welsh gathering is a fairly large one, we were unable to discover a single sporangium of the normal *Lepidoderma* type, and, had it not been for former experience, we should have placed our specimens under the genus *Chondrioderma* (Pl. 419, fig. 3 A). As we have just said, the deposits of lime on the sporangia of *L. tigrinum* are normally disc-like scales, and equally distributed; but we also find sporangia in which the flat deposits are star-shaped (Pl. 419, fig. 3 C), or they may be small, irregularly angled, and more or less crowded; in the specimen from Ceylon in the Kew Collection* the sporangia are covered with large stellate crystals of the true *Didymium* type; in a perfectly matured gathering made by Prof. Penzig in Java, in February, 1898, the dark sporangium-wall is traversed by broad, irregular white bands composed of free stellate crystals, resembling those in *Spumaria alba;* while, again, the purple-brown wall may be entirely free from deposits of lime. Such an instance of variation as I have described appears to be quite exceptional among the Mycetozoa, but it points to the need of some modification of Rostafinski's definition of the genus *Lepidoderma*.

STEMONITIS SPLENDENS Rost. var. β WEBBERI. I am indebted to Rev. W. L. W. Eyre for the inspection of a specimen of this form which he collected at Glengariff, Ireland, in May, 1900. A gathering with precisely similar characters was made by Mr. F. W. Evens in August, 1898, at Killarney; the only other occurrence of this variety in the British Islands that has come to our knowledge was near Falmouth, in March, 1899, recorded in a former notice (Journ. Bot. 1899, 150). These three gatherings represent the most perfect form of *S. splendens* that we have seen from this country; var. *α genuina* has not yet, it appears, been found here. The capillitium of var. β, with slender threads and broad mesh of the superficial net, takes an intermediate position between the neat structure of var. α and the loose and incomplete capillitium of var. γ *flaccida;* the latter form is far from uncommon with us, and is certainly very constant in its characters; but the flimsy, often branching columella associated with broad flakes of indefinite tissue imply an imperfect formation; the spores are precisely similar in all three varieties. The discovery of the variety *Webberi* in the South-west of Ireland, where the climate much resembles that of Cornwall, lends support to the view suggested in a former paper (*l.c.* p. 149), that the perfect development of the capillitium in *S. splendens* depends on climatic conditions.

ARCYRIA ŒRSTEDTII Rost. A fine gathering of this species was made in the woods of Humbie, Haddingtonshire, in July, 1899. It does not appear to have been before recorded from Scotland.

ARCYRIA INSIGNIS Cooke & Kalchb. Since the account of Mr. Cran's gatherings of this species in Antigua was given (Journ. Bot. 1898, 121), with a short history of the previous records, two further instances of its occurrence have come to hand. Dr. Sturgis found it in some abundance and in beautiful condition at Manchester, Mass., U.S.A.; and in November, 1900, Mr. Cran received some typical clusters of sporangia from Mr. Forrest, who had collected them in Antigua in the course of the autumn.

---

* B. M. Cat. p. 106.

Margarita metallica List. Miss M. Roberts gathered this species in November, 1900, in Carnarvonshire; it is the first time we have received it from Wales. The sporangia are iridescent with a coppery lustre; the flowing capillitium is more evidently branched than is often the case, and the attachments to the sporangium-wall are more distinct.

Dianema corticatum List. Since the winter of 1898, when Mr. Cran first discovered *D. corticatum* near his residence in Aberdeenshire (Journ. Bot. 1899, 152), he has continued to find it at intervals on dead wood; I have just received from him a fine specimen, gathered in December, 1900: the capillitium is perhaps more abundant than usual, but the spiral markings on the slender threads can only be made out by careful search; otherwise all his gatherings correspond exactly with the original type from Norway.

Prototrichia flagellifera Rost. We had no record of this species having been found in Scotland until November, 1890, when we received a specimen from Mr. Cran, gathered by him near Rhynie; it is the sessile form with faint spirals on the capillitium-threads, similar to many of our Lyme Regis examples.

Lycogala flavo-fuscum Rost. In Journ. Bot. 1897, 217, I referred to an æthalium of *L. flavo-fuscum* which Mr. Crouch had kept under observation in Bedfordshire since 1895, from the time that the white plasmodium emerged from a decaying elm to its reaching maturity. Two years later—in September, 1897—another æthalium appeared, and in October, 1899, a third came up within a few inches from the spot where the last had been found; the elm tree was near Mr. Crouch's residence, and constantly under notice. It is interesting to note that an interval of two years elapsed between the several growths of this apparently rare species.

Description of Plate 419.

1. *Chondrioderma simplex* Schroet.:—a. Group of sporangia, × 20. b. Capillitium, attached above and below to the sporangium-wall, × 280. c. Spores, × 280. d. Spore, × 600.

2. *Badhamia versicolor* List.:—a. Sporangia on lichen, × 20. b. Capillitium attached to a fragment of the sporangium-wall, × 280. c. Two clusters of spores, 280. d. A broken cluster and an isolated spore, × 280. e. Three spores, × 600.

3. *Lepidoderma tigrinum* Rost.:—a. Sporangia of *Chondrioderma* form, × 20 (Merionethshire). b. Sporangium showing lime, partly in vitreous discs, partly forming a calcareous crust, × 20 (from Dr. W. C. Sturgis, Shelburne, N.H.). c. Sporangia with stellate scales, × 20 (from Mr. Fries, Upsala).

NOTES ON BRISTOL PLANTS.

By Cedric Bucknall, Mus. Bac. Oxon.; David Fry; and Jas. W. White, F.L.S.

These notes are a continuation of those published in this Journal for 1893, pp. 115–117; for 1897, pp. 123-126; and for 1899, pp. 417–418. As before, new vice-comital records are preceded by an asterisk, and Watson's vice-counties 34 (W. Gloucester) and 6 (N. Somerset) are distinguished by G. and S. respectively.

Cerastium arvense L.—On a bank above Portbury, S.; *Miss Ida Roper*. Previously known in only one spot in the county of Somerset.

**Medicago apiculata* Willd.—Several plants on waste ground at Portishead, S., where it is probably an introduction. Not hitherto recorded for Somerset.

Rubus argentatus P. J. Muell. The Lord's Wood, Houndstreet, S.—**R. micans* Gren. & Godr. Clifton Down, G.—**R. Leyanus* Rogers, Damory Bridge, G.—*R. cæsius* × *R. rusticanus*. Keynsham, S. The abundance of this hybrid where it occurs is remarkable, as it grows at intervals for a considerable distance in hedges on both sides of a lane. For help in determining these plants we are again indebted to the kindness of the Rev. W. Moyle Rogers.

Rosa canina L. var. *dumetorum* (Thuill.). Burrington Combe (Mendip); Portbury; Portishead, *Mrs. Gregory*; Canal bank at Radford, S.

Cirsium arvense Scop, var. *obtusilobum*, f. *subincanum* G. Beck. Fl. N. Ö. p. 1239. Koch, Syn. ed. iii. p. 1553. Bank of the Avon below Bath, where this distinct-looking variety has been known for many years under the name of *Carduus setosus* Bess. (*Cirsium setsosum* Biebst.). The latter form is described in Koch, Syn. ed. ii., as *C. arvense* γ *integrifolium*, and has all the leaves entire or subdentate; and Syme, in Eng. Bot., says that the leaves are faintly sinuated or the upper ones nearly entire, and glabrous beneath. In the Bath plant most of the leaves are strongly sinuately lobed, with the lobes and the apex obtusely rounded and furnished with a short spine at the tip, and white-felted beneath. In these characters it agrees with the plant described in an arrangement of the forms given in the works quoted above, where they are grouped under three varieties as follows:—Var. *commune* G. Beck. Leaves attenuated into the terminal spine, with acute teeth.—Var. *obtusilobum* G. Beck. Leaves mostly pinnatifid, with lobes and apex obtusely rounded and furnished with a spine at the tip.—Var. *hydrophilum* G. Beck. Middle and lower leaves interruptedly decurrent. *C. setosum* Biebst. is placed under var. *commune* as a form with nearly entire leaves, almost or quite glabrous beneath. Although in the Bath plant the leaves are sinuately lobed rather than pinnatifid, it must be placed under the var. *obtusilobum*, and, as they are white-felted beneath, it is the f. *subincanum*. On dust-heaps on the opposite side of the river we have gathered a form with the leaves glabrous beneath, which is the f. *subviride* G. Beck.

The genus *Euphrasia* not having hitherto received much attention in this district, we think it well to give a complete list of the species we have met with, most of which have been submitted to Mr. F. Townsend, who has kindly examined them.—**Euphrasia stricta* Host. Well distributed, although not always typical. Charfield; Wotton-under-Edge; Wyck, G.; *Claverton Down, S.—**E. borealis* Towns. Wotton-under-Edge, G. — **E. brevipila* Burn. & Grml. Turf-moor near Edington; Edford; Failand; Tinings Farm and other places on Mendip, S. An eglandular form with deeply toothed leaves, exactly corresponding with Scotch specimens named *brevipila* by Mr. Townsend, was gathered in a dry field near Shapwick railway station, S.—*E. scotica* Wettst. was recorded under its synonym *E. paludosa* Towns. for the Somersetshire turf-moors in this Journal for April, 1896; but this was an error, the plant in question being undoubtedly *E. brevipila.*—*E. nemorosa* H. Mart. Cadbury Camp, near Clevedon; Cheddar; Congresbury; Churchill, S. On exposed downs in N. Somerset, as at Brean, Cheddar, and elsewhere on Mendip, a small form occurs which may readily be mistaken for *E. curta* Fr., but being almost entirely glabrous it must probably be referred to *E. nemorosa.*—**E. curta* Fr. var. *glabrescens* Wettst. Clifton Down, G.—**E. Rostkoviana* Hayne. On the turf-moor near Edington; Edford; Rowberrow Down (Mendip), S.—*E. Kerneri* Wettst. In boggy ground, Rowberrow Down (Mendip), S.; and gathered at Cheddar, S., by the Rev. W. H. Purchas, September, 1853.—**E. Levieri* Wettst. = *E. Rostkoviana* × *E. curta.* With the last-mentioned species at Rowberrow. This interesting form has been named by Mr. Townsend, who has not seen it before. He considers that if the two species, *E. Rostkoviana* and *E. curta*, are present, our specimens may be put to Wettstein's plant. *E. Rostkoviana* was certainly present, but amongst a large number of plants gathered none could be referred to *E. curta.* The hybrid plant is shortly pubescent, as in typical *E. curta*, and the large flowers and the presence of some glandular hairs show the influence of *Rostkoviana.* It seems not unlikely that *E. curta* has been nearly or entirely replaced by the hybrid.

**Utricularia intermedia* Hayne. This has hitherto been known in the South of England only from Hants and Dorset. We now add it to the flora of Somerset. Specimens of the foliage only have, so far, been found. These were taken from a peaty ditch on Clapton Moor, near Weston-in-Gordano, S., and have been named by the Rev. E. F. Linton, who says they have well-marked characters, and cannot belong to either of the other three recognized British species,

Buxus sempervirens L. The reasons for believing this shrub to be truly indigenous at a locality between Wotton-under-Edge and Alderley, in the West Gloucestershire portion of the Bristol district, have been fully stated by C. Bucknall in this Journal for January (p. 29).

Cyperus fuscus L. Near Clevedon, S. Discovered September, 1900, by Mr. S. I. Coley (see Journ. Bot. 1900, 446). The Bristol district has been fruitful in surprises, but no discovery could have been more unexpected by local field-botanists than that of the second British *Cyperus* in North Somerset, within a mile of the spot where *C. longus* existed until recently. The locality is a peaty valley between the Cadbury and Walton ranges of hills. Springs rise at the head of the valley, and drain towards Portishead by wide shallow rhines, with which intersecting ditches are connected. These ditches readily become choked with vegetation, and are cleared with the spade at least once a year. It unfortunately happened that those in which Mr. Coley met with the plant underwent this cleaning process before we could visit the place, so but few specimens were seen *in situ*. But an examination of the ditch-contents that had been thrown out upon the banks, and from which some very fair examples were recovered, showed that the *Cyperus* existed in great abundance in at least two rhines, and had extended along them quite a mile. It is not easy to understand how annual plants can maintain themselves under such circumstances. However, there are many that do. The *Cyperus* seeds very copiously, and is probably perpetuated by the few plants left upon the ditch-sides. The idea of recent introduction cannot, in our view, be entertained.

Scirpus cernuus Vahl. Near Clevedon, S. It was whilst exploring the *Cyperus* locality that we came upon this sedge, equally abundant on ditch-banks, and covering a larger area. There is but one other known locality in Somersetshire.

S. Tabernæmontani Gmel. Abundant for about eighty yards along a marsh-ditch at Ken Moor, near Yatton, S. Occurs only in three known localities in the whole county of Somerset.

Schœnus nigricans L. The restoration of this species to the flora of Somerset by its discovery near Winscombe, which is in the district of the Bristol Coal Field, was recorded by Mr. W. F. Miller in this Journal for August, 1900.

Carex axillaris Good. Four or five large plants on a ditch-bank near Yatton, S., growing with both *C. vulpina* and *C. remota*.

C. Hornschuchiana Hoppe. Peaty meadows near Weston-in-Gordano, and at Max, near Winscombe, S. First found at the latter station by Mr. Waterfall (Fl. Som. p. 365). Much less frequent in North Somerset than *C. distans*, the inland stations for which are remarkably numerous in that vice-county.

The following aliens have been observed:—*Malva parviflora* L. A large patch by a roadside in St. Philip's Marsh, Bristol, S.—*Amaranthus retroflexus* L. Very fine and abundant on made ground in St. Philip's Marsh, Bristol, S.; also on rubbish near Portishead railway-station, S., associated with *A. deflexus* L.

ELGIN MOSSES.

By J. A. Wheldon, F.L.S.

Two years ago, during a short visit, Mr. Macvicar collected a number of mosses in Elgin, but his time being much occupied in other directions, after a partial examination they were laid aside. He recently placed the whole collection at my disposal, and I have completed the determination of the specimens, with the assistance of Messrs. H. N. Dixon and E. C. Horrell in cases of difficulty or doubt.

The Watsonian vice-county Elgin or Moray (95) of the East Highlands Province is included by Mr. Horrell in that group of counties for which no satisfactory moss-lists exist. It therefore seems desirable that the following should be placed on record, as a contribution, necessarily very incomplete, to our knowledge of the plants of this vice-county.

Mr. Macvicar informs me that the specimens were collected in wet swampy ground intersected by a stream, and on walls, turfy banks, and dry ground by the roadside, during an afternoon's ramble near Grantown. The district is schistose, with beds of gravel.

Sphagnum papillosum Lindb. var. *normale* Warnst.—f. *conferta* (Lindb.).—*S. compactum* DC. var. *imbricatum* Warnst.—*S. molluscum* Bruch.—*S. subnitens* Russ. & Warnst. var. *obscurum* Warnst.—*S. rubellum* Wils. var. *versicolor* Russ.—*S. rufescens* Warnst.

Andreæa petrophila Ehrh.

Catharinea undulata W. & M.

Polytrichum aloides Hedw. — *P. urnigerum* L. — *P. piliferum* Schreb.—*P. juniperinum* Willd.

Ditrichum homomallum Hampe.

Ceratodon purpureus Brid.

Dichodontium pellucidum Schimp., with a form tending towards var. *fagimontanum* Schimp. in its short blunt leaves, but otherwise nearer the type.

Dicranella heteromalla Schimp.

Blindia acuta B. & S.

Dicranum scoparium Hedw.—Var. *orthophyllum* Brid.

Leucobryum glaucum Schimp.

Fissidens taxifolius Hedw.

Grimmia apocarpa Hedw.—Var. *rivularis* W. & M.—*G. pulvinata* Sm.—*G. trichophylla* Grev.

Rhacomitrium aciculare Brid.—*R. heterostichum* Brid.—*R. lanuginosum* Brid.—*R. canescens* Brid.—Var. *ericoides* B. & S.

Tortula muralis Hedw.—*T. subulata* Hedw. The capsules only about half the usual size, otherwise quite normal.—*T. ruralis* Ehrh.

Barbula rubella Mitt. — *B. rigidula* Mitt. Very short and densely compact tufts, apparently from walls. The leaves, however, quite typical in shape and areolation, and the axillary gemmæ numerous.—*B. convoluta* Hedw.—*B. unguiculata* Hedw.

Encalypta streptocarpa Hedw.—*E. vulgaris* Hedw.— *Zygodon viridissimus* R. Br.

Ulota Drummondii Brid.—*U. crispa* Brid.—*U. intermedia* Schimp. *U. Bruchii* Hornsch.

Orthotrichum rupestre Schleich. A single tuft, growing on tree-bark. This is probably the variety *Franzonianum* Vent. It is smaller and greener than the typical plant. The peristome is erect and whitish, and the superficial stomata ascend far above the middle of the capsule.—*O. leiocarpum* B. & S.—*O. Lyellii* Hook. & Tayl. — *O. affine* Schrad. — *O. rivulare* Turn. — *O. stramineum* Hornsch.

Funaria hygrometrica Sibth.

Bartramia ithyphylla Brid.—*B. pomiformis* Hedw.

Philonotis fontana Brid.

Webera nutans Hedw.—*W. annotina* Schwaegr.—*W. albicans* Schimp.

Bryum pendulum Schimp. The true plant, with the peristome of section *Ptychostomum*.—*B. inclinatum* Bland.—*B. pallens* Swartz. *B. pseudo-triquetrum* Schwaegr.—*B. capillare* L.—*B. erythrocarpum* Schwaegr.—*B. argenteum* L.—*B. cæspiticium* L.

Mnium affine Bland.—*M. rostratum* Schrad.—*M. undulatum* L. *M. hornum* L.—*M. punctatum* L.

Fontinalis antipyretica L.—*F. squamosa* L.

Thuidium tamariscinum B. & S.

Climacium dendroides W. & M.

Brachythecium albicans B. & S.—*B. rutabulum* B. & S.—*B. rivulare* B. & S., with a form approaching the var. *chrysophyllum* Spruce in having plicate leaves with recurved margins; but they do not in other respects agree with specimens I have from Mr. Bagnall.—*B. velutinum* B. & S.—*B. plumosum* B. & S.—*B. purum* Dixon.

Eurhynchium piliferum B. & S. *E. prælongum* B. & S.—*E. Swartzii* Hobk., the slender yellowish green form, with distant leaves.—*E. myosuroides* Schimp.—*E. striatum* B. & S.—*E. rusciforme* Milde.—*E. confertum* Milde.

Plagiothecium denticulatum B. & S., cum fructu.

Amblystegium filicinum De Not.

Hypnum stellatum Schreb.—*H. uncinatum* Hedw., cum fructu, and forma *plumosa* Schimp.—*H. revolvens* Swartz.; *typicum*, and also the form with large false auricles, the var. *subauriculatum* of Renauld formerly, which he does not now separate varietally. —Var. *Cossoni* Ren. — *H. cupressiforme* L. — Var. *resupinatum* Schimp.—Var. *ericetorum* B. & S.—Var. *tectorum* Brid.—Var. near *filiforme* Brid.—*H. molluscum* Hedw.—*H. palustre* L., including forms with all the vegetative characters of the var. *subsphæricarpon* B. & S., but the fruit of the type. There can be no question that Mr. Dixon's view of this variety is the correct one, and that barren specimens cannot safely be referred to it.—*H. cuspidatum* L.—*H. Schreberi* Willd.

Hylocomium splendens B. & S.—*H. squarrosum* B. & S.—*H. triquetrum* B. & S.

NOTES ON LATHYRUS.

By James Britten, F.L.S.

Some time ago, when working at this genus, I noted that the synonymy both under it and under *Orobus* in the *Index Kewensis* was greatly confused. The reduction of the species of *Orobus* to *Lathyrus* partly accounts for this, the fact that the same trivial name has been employed under each genus having led to the assumption that the same plant was intended in each case. So far as I know the *Index*, no genus requires so much revision as *Lathyrus*. I do not, however, propose to undertake such a task, but it may be well to put on record some of the notes I made.

The greatest individual factor in the confusion which exists is undoubtedly the placing together under *Lathyrus montanus* of two references which indicate entirely different plants, and the assignation to this compound of a large number of synonyms, which have to be differentiated. I had drawn out a list of these, separating those which belong to *L. montanus* Bernh. (*Orobus tuberosus* L., *L. macrorrhizus* Wimm.) from those of *L. montanus* Gren. & Godr. (*O. occidentalis*). But I find that Dr. Karl Fritsch has already indicated the necessary changes in his paper, "Ueber einige *Orobus*-Arten und ihre geographische Verbreitung"*—a paper in which the plants of the group are dealt with so fully and exhaustively that I have had no hesitation in suppressing my notes upon them, save in one or two special cases. Further elucidations from Dr. Fritsch's pen are "Ueber den Formenkreis der *Orobus luteus* L." (Verhandl. der K.K. zool.-bot. Gesellschaft in Wien, Feb. 9, 1900), and a paper in Oesterr. bot. Zeitschrift for November, 1900, pp. 389–396. Dr. Ginzberger's important paper, "Ueber einige *Lathyrus*-Arten am der Section *Eulathyrus*" (Sitzber. Akad. Wissenschaft. Wien, cv. 1, 281–352), is not concerned with the plants on which I offer these notes.† They are not in any way exhaustive, and some are of small importance; others, such as that on *L. magellanicus*, may, I hope, prove of sufficient interest to warrant publication. I cite the names as they stand in Mr. Jackson's *Index*.

"L. Alberjilla Steud. Nom. ed. 2, ii. 13 [1841]." A reference to Steudel gives this information: "Lathyrus (vulgo Alberjilla) Bert. Herb. nr. 1073." I have not seen this number of Bertero's, and am doubtful whether this indication is sufficient for the establishment of a species. Gay (Fl. Chil. ii. 141) gives "Alverjilla" as the popular Chilian equivalent of *Lathyrus*, and especially (p. 148) for *L. pubescens*. Neither Philippi (Cat. Pl. Chil. 1881) nor Reiche (Fl. de Chile, 1898) cites Steudel's name.

---

* Sitzber. Akad. Wissenschaft. Wien, civ. 479–520.

† On p. 336 Dr. Ginzberger takes exception to the quotation of *Lathyrus magniflorus* from Mill. Gard. Dict. in Ind. Kew., and says, "ein solcher Name existirt nicht." He will, however, find it with many similar corrections of the text on the very last page of Miller's *Dictionary*.

"L. AMERICANUS Mill. Dict. ed. viii. no. 19 = *Baptisia perfoliata*?" This is *Rhynchosia menispermoidea* DC.; see Journ. Bot. 1897, 231.

L. ANNUUS "Linn. Amœn. Acad. iii. 417 (nota) [1756]" dates from Demonstr. Plant. p. 20 (1753).

L. APHYLLUS "Link, ex Webb & Berth. Phyt. Canar. ii. 103 [1836]" should stand as "Link in Buch, Phys. Beschr. Canar. Ins. 157 (1825)."

"L. ARMITAGEANUS Knowles & Westc. Flor. Cab. iii. ('1840') [1839] 81 = nervosus Lam." This name was published at an earlier date: in Loud. Gard. Mag. xi. (1835) p. 525, it is quoted from Aris's Birmingham Gazette of the same year, and the name is also cited by Sweet (Brit. Fl. Gard. 2nd Series, iv. 344 (1836) as "*L. Armitageanus* West in Hort. Birm." Loudon takes "West" as referring to a "West Birmingham Botanical Society," but it is doubtless an abbreviation of "Westcott," who was secretary of the Birmingham Society.

"L. AURANTIUS C. Koch. in Linnæa, xv. 723 (1841)" = Vicia aurantia.

"L. INERMIS Rochel, ex Frivald. in Magyar Tud. Tár. Evkon. ii. (1835) 250, t. 2 = hirsutus." This is an error; the plant is identical with *L. villosus* Frivald. in Flora, xix. 437 (1836), and antedates that name. The Kew Index erroneously identifies *Orobus hirsutus* L. with *L. hirsutus* L. We have specimens from Frivaldsky of *L. inermis* and *L. villosus*.

"L. LUTEUS Munby, Fl. Alger. 73" [78] = L. annuus ex Battandier, Fl. Alger. 278—an identification suggested by Munby when proposing his species.

L. MAGELLANICUS Lam. Under this name two very different plants have been confused for nearly a century, and are combined in the *Index Kewensis*. The confusion began in Aiton's *Hortus Kewensis* (iv. 309), where *Pisum americanum* of Miller's Dictionary is placed as a synonym under *L. magellanicus*. This seems to have been done at the suggestion of Robert Brown, who has identified Miller's plant in the Banksian Herbarium with *L. magellanicus* Lam., and indicates that he proposed to place it under *Pisum* in Hort. Kew. ed. 2. From Lamarck's description it differs at first sight by the fact that it does not turn black in drying, as is the case with the group of forms or species of which *magellanicus* is the type; and a tracing of the original in the Paris Herbarium, for which we are indebted to M. E. Bonnet, confirms its distinctness from Miller's plant. This latter we have no hesitation in referring to *L. nervosus* Lam.

Of Miller's plant we have, besides the sheet from Chelsea Garden in the Banksian collection, another specimen grown in the same garden in 1762. Its history, as narrated by Miller, is of some interest; he says:—"This was brought from Cape Horn by Lord Anson's cook, when he passed that Cape, where these peas were a great relief to the sailors. It is kept here as a curiosity, but the peas are not so good for eating as the worst sorts now cultivated in England; it is a low trailing plant, the leaves have two lobes on each foot-stalk; those below are spear-shaped, and sharply indented on their edges, but the upper leaves are small and arrow-pointed. The flowers are blue, each foot-stalk sustaining four or five flowers; the pods are taper, near three inches long, and the seeds are round, about the size of tares." He says it is "commonly called Cape Horn Pea," and Aiton adds the name "Lord Anson's Pea": these, owing to the confusion between the two plants, are sometimes assigned in books to *L. magellanicus* Lam. D. Don in the description accompanying the plate in Sweet's *British Flower Garden* (2nd Series, iv. 344 (1836)) rightly identifies the plant figured with Miller's *Pisum americanum*, which he follows Aiton in regarding as *L. magellanicus*.* This figure is no doubt responsible for the confusion which at present exists in gardening books, as well as in seed and plant catalogues, in which, according to the Rev. C. Wolley Dod (Gard. Chron. Aug. 18, 1900, p. 135), "Lord Anson's Pea" is often offered, but the species sent for it is *L. tingitanus*, or more frequently *L. sativus*. According to a previous article by the same writer (*op. cit.* 114) the true plant was not known in cultivation between the time of Miller and that of Sweet; after 1836 it was again lost sight of, until re-introduced (it is not stated whence) by Mr. A. Bulley, in whose garden in the Wirral of Cheshire Mr. Dod saw it flowering in July, 1899. The actual locality where the plant was found, according to Mr. Dod, who has consulted the histories of Anson's voyage, was Port St. Julian.

The synonymy of the plant, so far as I have traced it, is as follows:—

L. NERVOSUS Lam. Dict. ii. 708 (1786).
  Pisum americanum Mill. Dict. ed. 8, no. 5! (1768).
  L. magellanicus Ait. Hort. Kew. ed. 2, iv. 309 (1812) excl. descr. non Lam.; D. Don in Sweet Brit. Fl. Gard. 2 Ser. iv. t. 344 (1836); Steud. Nomencl. ed. 2, ii. 14 (quoad syn.) (1841); Hook. f. Fl. Antarct. 259 (quoad syn.) (1847); Nicholson, Dict. Gardening, ii. 237; Jackson, Ind. Kew. ii. 38 (ex parte).
  L. Armitageanus West. ex Sweet, l. c.; Knowles & Westc. Fl. Cab. iii. t. 81 (1839). See p. 97.
  L. trigonus Vogel in Linnæa, xiii. 31 (1839), fide Hook. Bot. Mag. t. 3987 (1842).
  L. elegans Vogel, l. c. p. 30, fide Benth. in Fl. Bras. xv. i. 115 (1859).

"L. MESSERSCHMIDII Franch. et Sav. Enum. Pl. Jap. i. 106" = Vicia unijuga.

"LATHYRUS PARISIENSIS Mill. Dict. ed. viii. no. 4." This name, which appears among the "species non satis notæ" of DeCandolle's

---

* Don refers to "native specimens collected at Port Desire, in the Straits of Magellan, by Sir Joseph Banks and Dr. Solander," but the specimens from that locality in Herb. Banks seem to have been collected by Captain King, and there is no reference to the species in the MS. lists of Banks and Solander.

Prodromus, is retained in the *Index Kewensis*. Miller himself combined two plants in his description. His descriptive phrase—"pedunculis unifloris, cirrhis polyphyllis, stipulis lanceolatis"—agrees with the specimens in the National Herbarium; but the Tournefortian synonym cited belongs, as correctly given in *Hort. Cliffort.* (p. 368), to *L. palustris*, L.; and it is probably to this that his English locality applies.

The plant first appears in the 7th ed. of the *Dictionary* (No. 5), where the English description runs:—"The fifth Sort grows naturally about *Paris;* this is an annual Plant with a slender Stalk, about two Feet high, garnished with Leaves, composed of several narrow Lobes placed alternate along the Mid-rib, which ends in Claspers. The Flowers come out singly upon pretty long Foot Stalks; they are blue, and about the Size of those of the common Tare. It grows naturally in some Parts of *England*, particularly on *Windsor* Forest, in moist Meadows, and has often a variable Flower." The specimens are from the Paris Garden, and are *L. articulatus*, L.—a plant which Miller also describes under the name *L. hispanicus*. This of course is not an English plant, and it is not easy to decide what Miller had in view when he speaks of it as such. I am inclined to think that, like Tournefort's synonym, *L. palustris* (of which, as already noted, he cites Tournefort's descriptive phrase as a synonym) was the plant in question. Mr. Druce does not cite Miller under any *Lathyrus*, and the occurrence of the species in Berkshire is, as he points out, doubtful, although he thinks Blackstone's Abingdon locality "not an unlikely one."* Perhaps, however, a form of *L. montanus* was intended, for it will be noted that, although Miller describes the blossoms as blue, he adds, "it has often a variable flower."

The misapplication of Tournefort's name may perhaps be accounted for by the fact that it is written by Linnæus on a sheet in Cliffort's Herbarium (where is also the type of the species), which appears to belong here, but which is noted by Linnæus as "malum specimen."

It may be worth noting that the generally accepted identification of *L. hispanicus* Mill. with *L. articulatus* is confirmed by specimens from Chelsea Garden in 1732, 1754, and 1776, and by plate xcvi. of his *Figures of Plants*.

"L. VENOSUS Mühl. ex Willd. Sp. Pl. iii. 1092" (1800) = *Vicia venosa* Maxim., also retained. Owing to the same trivial having been employed under *Lathyrus* and *Orobus* for two different plants, the references in Ind. Kew. need correction. To *Vicia venosa*, besides the name above quoted, must be referred *Orobus Muehlenbergii* Alef. in *Bonplandia*, ix. 146; the other names so assigned belong to *Orobus venosus* Willd.

OROBUS JAPONICUS Alef. in Bonplandia, ix. 143 (1861), referred to *Vicia pallida* in Ind. Kew. = Lathyrus maritimus.

---

* It may be noted that "the statement in Top. Bot. 'Berks, Britten, v. sp.'" is not entirely "a mistake," as Mr. Druce supposes; it refers to the specimen in Dickson's *Hortus Siccus*, localized, "Woods, Berkshire," which, however, Mr. Druce is probably right in considering "not to be trusted."

O. Piscidia Spreng. Pugill. i. 47 (1813). The doubt which has attached to this name can now be dispelled. Sprengel based his species on "*Vicia Piscidia* Forst. mscpt. In herbario Forsteri sub hoc nomine aderat nusquam descripta planta." The drawing by Forster in the Department of Botany bears the two names *Vicia Piscidia* and *Galega littoralis*; the plant, published under the latter name by G. Forster in his *Prodromus*, p. 52, is *Cracca purpurea*, L.

"Orobus pyrenaicus Linn. Sp. Pl. 729 = Lathyrus montanus." The synonyms quoted by Linnæus for this plant represent, as demonstrated by Lapeyrouse in an excellent and interesting paper in Mem. Mus. Nat. Hist. Paris, ii. 292–301 (1815), two species. No type exists in Linnæus's herbarium at the Linnean Society, and he indicates by the sign † which he appends to the descriptive phrase cited from Sauvages that the material on which it is founded is unsatisfactory. The synonyms quoted are:—

"Orobus pyrenaicus, foliis nervosis. *Tournef. inst.* 235 [393].

"Orobus pyrenaicus latifolius nervosus. *Pluk. phyt.* 210 f. 2." Each of these is made by Lapeyrouse the type of a species—*O. Tournefortii* and *O. Plukenetii* respectively; both are referred in the *Index Kewensis*—the former doubtfully and the latter without hesitation—to *L. montanus* [Bernh.].

So far as Plukenet's plant is concerned, a reference to his specimen preserved in Herb. Sloane, xcvii. fol. 44, which his figure accurately represents, confirms this determination. Tournefort's synonym, however, presents more difficulty.

Lapeyrouse (*l. c.* 396) speaks of having found in Tournefort's herbarium "des magnifiques individus de son orobe des Pyrénées," and proceeds to show their distinctness from the Petiverian plant with which Linnæus had united them. He considers Tournefort's plant a new species between *O. luteus* and *O. vernus*: "elle se rapproche du premier par son port et son feuillage, et du second par ses feuilles et ses fleurs." Subsequent authors—*e. g.* Willkomm and Lange—have referred *O. Tournefortii* to *L. luteus*. Nyman (Consp. 204), who has seen the type specimens, says: "*O. Tournefortii* Lap. (sec. specc. hort. paris.) est var intermedia subangustifolia, qualis pl. Bourg. alp. Saband. 69." Taking *luteus* in a large sense, *O. Tournefortii* would appear from Lapeyrouse's excellent figure to be nearest that species; but those who have so decided seem to have overlooked the fact that Lapeyrouse describes the flowers as purple, and we do not find that those of *luteus* vary to that colour.

This description is borne out by the specimen in Cliffort's Herbarium, which bears the Tournefortian synonym in Linnæus's handwriting, and has been named *pyrenaicus* by whoever added the Linnean specific names to the sheets of that collection. This specimen so exactly corresponds with Lapeyrouse's figure that it might have been the original; and the flowers are unmistakably purple. It is probable that this specimen was sent by Tournefort to Linnæus, and that a specimen in Herb. Sloane, cccxxvi. appendix, fol. 23—which is certainly the same—came also from Tournefort. Lapeyrouse, however (Hist. Abr. Pl. Pyr. Supp. 108 (1818)), says: "L'*O. pyrenaicus* Lin. Sp. 1029 ne doit plus être compté dans le nombre des végétaux. C'est une espèce qui n'existe pas."

I have not found any wild specimen which exactly matches *O. Tournefortii*, and my knowledge of the genus is not sufficiently extensive to enable me to arrive at any definite conclusion regarding its position. But it certainly has no affinity with *L. montanus* Bernh. M. Rouy (Fl. France, v. 269) retains it (as *L. Tournefortii*) as a subspecies of *L. luteus* (*L. Linnæi* Rouy), and suggests that it may be a hybrid between the form of *luteus* which he calls *hispanicus* and *L. montanus* Bernh. Dr. Fritsch (Sitzb. Akad. Wissensch. civ. 481) has a note on the plant, and thinks it may be a hybrid between *L. luteus* and *L. vernus*. The name has been very variously applied in herbaria.

NEW CHARACEÆ RECORDS.

By the Rev. G. R. Bullock-Webster, M.A.

During the summers of 1899 and 1900 I have had opportunities for *Chara*-hunting in various localities, and have been able to add the following new vice-county records:—

Chara fragilis Desv., *C. fragilis* var. *Hedwigii* Kuetz., and *C. vulgaris* Linn. All growing together in a small stream near Isle Abbots, South Somerset, September, 1899.—*C. contraria* Kuetz. and *Nitella flexilis* Agard. Growing together in some abundance in Fowlmere, near Thetford, West Norfolk, June, 1899.—*C. contraria* var. *hispidula* Braun. In a coprolite pit, Bottisham fen, Cambridge, June, 1900.—*C. hispida* Linn. and *Tolypella glomerata* Leonh. Growing together in a drain near Sedgemoor Cut, North Somerset, May, 1899.

Tolypella glomerata Leonh. In one of the clay-pits near Bridgwater, North Somerset, August, 1899. North Devon is the only other recorded county for this plant west of Hampshire. This same pit yielded also some fine specimens of *C. vulgaris* var. *papillata* Wallr., but this variety has already, I think, been recorded for North Somerset.

C. canescens Loisel. Hickling Broad, June, 1899. This adds a fourth to the three known counties (Cornwall, Dorset, and Suffolk) in which the plant has been found.

Lychnothamnus stelliger Braun. Sowley pool, near Lymington, Hampshire, August, 1900. This is an interesting addition to the three known stations for this rare Charad—Slapton Lee, Devonshire; Walton-on-Thames, Surrey; and Hickling Broad (and neighbourhood), Norfolk. Sowley pool, it appears, was formed in the reign of King John by the monks of Beaulieu, who threw up an immense dam (the present road) across a natural valley where formerly two streams ran into the sea. By the courtesy of the owner of Sowley House, I had the advantage of the use of a boat, and explored the pool with some care. The season was too far advanced, however, to admit of good results. *Chara fragilis*, *Nitella translucens*, and

N. opaca were to be found still lingering, but in a decayed condition. These species are already recorded for Hampshire, but *Lychnothamnus stelliger* was a quite unexpected discovery. It occurred in more than one part of the pool, but very sparsely, and in poor condition. The plant, however, with its starlike bulbils, was quite unmistakable, and scarcely needed Messrs. Groves's authority to confirm it.

These ten new records show that the *Characeæ* are still a much neglected order of plants, awaiting—and certainly deserving—the closer attention of botanists.

The absence of *Characeæ* from the Somerset fenlands seems a curious fact. The conditions appear in every way favourable, and precisely similar to our eastern county fenlands where these plants luxuriate. Yet it requires a laboured search to discover any specimens in Sedgemoor and in Brue Level, and such as are to be found are starved and feeble specimens.

Before I close I should like to put on record the remarkable yield of *Characeæ* supplied by a small coprolite pit at Clayhithe, near Cambridge. The pool is some two hundred yards long, I suppose, and about twenty yards wide, and lies in the middle of a field of arable land. It has a shelving bottom along one side, and perpendicular banks and very deep water on the other. In this piece of water I have collected on one and the same day *Chara fragilis* Desv., *C. aspera* var. *desmacantha* H. and G. Groves, *C. polyacantha* Braun, *C. contraria* var. *hispidula* Braun, *C. vulgaris* Linn., and var. *longebracteata* Kuetz., *C. hispida*, Linn., *Tolypella glomerata*, Leonh., and *Nitella tenuissima* Kuetz. All these grow together in happy association and in a very fine state.

TWO NEW SOUTH AFRICAN SCROPHULARIACEÆ.

By W. P. Hiern, M.A., F.L.S.

The two species now described form part of a small collection made in the Orange River Colony last year by Lieut. Pateshall Thomas, and recently brought to the National Herbarium.

Hemimeris elegans, sp. n. Herba minute glandulosa fere glabra pallide viridis forsan perennis, caulibus gracilibus tenacibus ascendentibus basim versus foliosis tetragonis 1 dm. longis vel ultra, foliis oppositis vel superioribus alternis ovatis lanceolatisve superioribus angustioribus apice obtusis apiculatisque basi plus minusve cordatis vel truncatis breviter petiolatis margine paucidenticulatis 6–10 mm. longis 1·5–4 mm. latis superioribus minoribus sessilibusque, internodiis mediis superioribusque quam folia longioribus, racemis terminalibus paucifloris laxis 19–44 mm. longis, bracteis (foliis floralibus) alternis ovatis sessilibus 2·5–3 mm. longis, pedicellis gracilibus unifloris subglandulosis 9–19 mm. longis, calycis segmentis ovali-ovatis obtusis glandulosis sub flore 2·5 mm. longis sub fructu juveni 3·5 mm. longis, corollâ sub-purpureâ 12–17 mm.

latâ bilabiatâ, labio superiore 4-lobo lobis rotundatis 3–4 mm. latis, labio inferiore concavo integro rotundato subtiliter nervoso 9 mm. lato, calcaribus 2 conicis obtusis divergentibus 9 mm. longis, filamentis complanatis non villosis 1·25–2 mm. longis, capsulâ juveni ovoideâ minute glandulosâ calycem leviter excedente.

Habitat coloniæ *Orange River* in regione *Kalahari;* legit anno 1900 Lieut. *Pateshall Thomas!*

This new species belongs to the genus, the type of which is HEMIMERIS *bonæ-spei* L. Pl. Afr. Rar. p. 8, n. 1 (Dec. 1760); the latter is the only species which Linnæus referred to the genus. Since Richter in his *Codex botanicus linnæanus* (1840) does not notice it, and since *Hemimeris*, as used by Bentham and other authors, is a different, though allied, genus, an explanation becomes necessary. Linnæus in 1763 republished the dissertation *Plantæ africanæ rariores* in the sixth volume of his *Amœnitates Academicæ*, pp. 77–112, and added an appendix; to some extent this is a revision of the original tract, and HEMIMERIS *bonæ spei* is changed into PÆDEROTA *bonæ spei*, but the description and synonyms are repeated, with the addition, however, of "fol. pinnatifidis" after the name, and of DIANDRIA over the name; these additions make no difference in effect, because in the body of the description the leaves were described as "pinnatifida," and the position of the plant at the head of the enumeration, followed next by a *Gladiolus*, suggests the class DIANDRIA. Sir J. E. Smith was aware of what Linnæus had done, for, in an article signed "S." in Rees, Cyclop. xvii. p. 4 H (1811), he wrote, under *H. diffusa*, "We can hardly doubt that the original *Hemimeris* (afterwards called *Pæderota*) *bonæ spei* is this species, though it was at first described as diandrous." *Hemimeris diffusa* L. f. has subsequently been split into segregates, all of which are referred to *Diascia* Link & Otto; and Bentham in DC. Prodr. x. p. 257 (1846), under *D. diffusa*, had the following note: "Thunbergius sub nomine H. diffusæ verisimiliter species plures affines confudit. Linnæus speciem quamdam huic affinem nomine Pæderotæ Bonæ-Spei signavit."

There is no reason to doubt that *Hemimeris bonæ-spei* L. is of the same genus as *Diascia* Link & Otto, and this determination is confirmed by the Linnean Herbarium, wherein two specimens in *Hemimeris* on a sheet named "b. spei" can be easily recognized as belonging to *Diascia* L. & O. The younger Linnæus, Willdenow, and Thunberg used *Hemimeris* to include all the plants above referred to; and in 1828 Link and Otto, Ic. Pl. Sel. p. 7, t. 2, published the genus *Diascia*, which has since been accepted, and the other species of the younger Linnæus have been kept in a genus to which the name of *Hemimeris* L. f. is retained, notwithstanding the fact that *Hemimeris* L. is considered to be different. The rule of priority does not sanction the dropping out of use of the original *Hemimeris*, and on that account I use the name in the correct sense. It is very unfortunate that Richter did not quote the first edition of Linnæus's Dissertations; he uniformly quoted, instead of the Dissertations, the reprints or revisions as they appeared in the *Amœnitates Academicæ;* possibly he had not access to the originals.

Diclis umbonata, sp. n. Herba parvula inflorescentiâ glanduloso-puberulâ exceptâ glabra ut videtur perennis, caudice subligneo, caulibus tenacibus subtus pallidis super herbaceis et pallide viridibus ascendentibus tetragonis semipedalibus vel ultra dimidio inferiore folioso superiore minus foliato, foliis oppositis anguste ellipticis vel lanceolatis apice obtusis basi breviter petiolatâ subsessilive plus minusve angustatis vel fere rotundatis firme herbaceis utrinque viridibus subtus subpallidioribus margine denticulatis vel subintegris 6–10 mm. longis 1·25–3·5 mm. latis, petiolis brevissimis latiusculis anguste decurrentibus, racemis terminalibus brevibus densisque vel subtus laxioribus atque circiter 44 mm. longis plurifloris, pedicellis in bractearum axillis orientibus unifloris ebracteolatis, inferioribus fere ad 25 mm. longis subgracilibus rectis patulis, superioribus brevioribus, bracteis foliorum similibus sed minoribus et glanduloso-puberulis, calycis segmentis ovato-ovalibus obtusis glanduloso-pilosulis 2–2·5 mm. longis, corollâ subpurpureâ bilabiatâ, labio posteriore trifido 6 mm. longo lobis rotundatis, labio anteriore bifido 8 mm. longo lobis semi-ellipticis mediâ basi umbone aurantiaco puberulo præditis, palato pulverulento umbonibus 2 aurantiacis breviter barbatis sub labii anterioris eis prædito, calcare e basi conicâ anguste oblongo obtuso parum curvo 4·5 mm. longo, filamentis glabris nitidis latiusculis, longioribus 1·25 mm. longis, brevioribus ·625 mm. longis, antheris aurantiacis 1 mm. longis.

Habitat coloniæ *Orange River* in regione *Kalahari;* legit anno 1900 Lieut. *Pateshall Thomas*!

The habit of this plant, with its comparatively narrow leaves, suggests the genus *Nemesia*, but the corolla is that of *Diclis;* the specimens unfortunately do not supply ripe fruit.

BRITISH HIERACIA.

As we announced in our last issue, Messrs. Linton have issued the sixth fascicle of their useful and admirably prepared series of British Hieracia, thus bringing their original undertaking to a close. They think, however, that a supplementary fascicle of forms not represented in the set may be forthcoming later. The present fascicle contains the following forms which are believed to be endemic:—*H. anglicum* var. *calcaratum; H. Griffithii; H. Leyi; H. Schmidtii* var. *eustomon; H. caledonicum; H. rubicundum* var. *Boswelli; H. argenteum* var. *septentrionale; H. Sommerfeltii* var. *splendens; H. saxifragum* var. *orimeles; H. rivale* var. *subhirtum; H. murorum* var. *pulcherrimum; H. murorum* var. *lucidulum; H. murorum* var. *sanguineum; H. murorum* var. *subulatidens; H. orcadense; H. Orarium* var. *erythræum; H. duriceps; H. vulgatum* var. *amplifolium; H. vulgatum* var. *mutabile; H. surreianum; H. stenophyes* var. *oxyodus; H. gothicum* var. *Stewartii; H. rigidum* var. *longiciliatum; H. cantianum* var. *subrigidum; H. zetlandicum* forma?; *H. vulgatum* var. *sejunctum.*

The notes accompanying the specimens may be of interest to others than those who subscribe to the set, and we reproduce most of them here with the authors' permission.

"*H. anglicum* Fr. var. *calcaratum* E. F. Linton. This variety resembles var. *jaculifolium* F. J. Hanb. in the stalked narrow stem-leaf (if present, which more often it is not) and stem smoother than the type, but in other respects it differs much. The petioles are shaggy, the root-leaves are broadly oval, the earlier ones more rounded, stem grey, and peduncles cano-floccose; phyllaries rather narrow and short (recalling some of the *Vulgata*), floccose especially on the margins, ligules well developed, pilose at the tips. Limestone cliffs near Kendal, Westmoreland, and the west borders of Brecon.

"*H. Orarium* Lindeb. form or var.? The plant now sent out differs much in appearance from the var. *fulvum* F. J. Hanb. occurring near Bettyhill, so much so that this name was denied it by Mr. Hanbury. It is, however, this species, and may be a mere sandhill form, but if the undulate and rubescent margins of the strongly dentate leaves, and the more equal proportion of involucral hairs and glands prove permanent characters, the varietal name *erythræum* E. F. Linton may be used to denote it.

"*H. vulgatum* Fr. var. *sejunctum* W. R. Linton. Root-leaves rosulate, stems floccose and with long white hairs, usually few-leaved (2-4, rarely -9); leaves yellowish-green, *firm in texture, sharply dentate with several large cusped teeth*, stellately pubescent beneath, hairy above; panicle subumbellate, heads 4–12, floccose hairy and thinly setose, styles livid, ligules glabrous at the tip. The Rev. E. S. Marshall, who gathered the series, considered that the texture, colouring, and dentation of the leaves separated it from *H. vulgatum*. The inflorescence, however, presents no distinctive feature, and we think it best under this species. We have what seems to be the same form from Cantire, Arran, and Dumbarton.

"*H. surreianum* F. J. Hanb. var. *megalodon* E. F. Linton. Mr. Hanbury pronounced the previous number (146) typical, and this (147) a varietal form. The latter is embraced by his description of *H. surreianum*, but differs from the type in paler heads (greener when dry and not so dark) and more coarsely dentate leaves. Neither occurs in Scandinavia.

"*H. stenophyes* W. R. Linton var. *oxyodus* W. R. Linton. This variety grows near the Midlaw Burn, Moffat Water, and differs from the type in the following particulars: inner root-leaves and stem-leaves more lanceolate, much more deeply cut, with large long cusped teeth; peduncles straight or nearly so, floccose, setose, and slightly hairy, as are the heads; phyllaries broad, blunt, even the margins rather dark; ligule tips ciliolate.

"*H. cantianum* F. J. Hanb. var. *subrigidum* E. F. Linton. Differs from the type in the more densely floccose peduncles, more numerous involucral hairs, and somewhat livid style. An approach towards *H. rigidum* in these points and in its general facies.

"Besides these, some other numbers call for comment:—

"*H. Griffithii* F. J. Hanb., originally described as a variety of *H. clovense* Linton in Journ. Bot. (1894), with but a few characters to separate it from that species, was raised to specific rank (B. E. C. Rpt. 1895, 486; 1897, 553) with no more complete description. It has been confused with *H. saxifragum* Fr. var. *orimeles* F. J. Hanb., from which the long white hairs all up the stem and rather villous involucre help to distinguish it; and seems to require some marks to separate it from forms of *H. Schmidtii* Tausch.

"*H. saxifragum* Fr. var. *orimeles* F. J. Hanb. The plant we are issuing is that which has appeared in lists under this name, but we are not content with its position under *H. saxifragum* Fr., nor do we think it identical with some *H. saxifragum* forms from Scotland that have been united with it. The leaves are much broader in proportion to their length than any *H. saxifragum* variety, more abruptly reduced to the petiole (which is less winged), much greener and thicker; the cauline leaves have a tendency to be patent and not suberect as in *H. saxifragum*, the panicle is laxer. It does not appear to have been described, even as a variety (see Journ. Bot. 1894, 228; 1893, 18); we therefore give a description (drawn up by W. R. L.) to accompany our specimens.

"*H. orimeles* (sp. nov. ?) *Green*, slightly glaucous. St. 12–15 in., hairy, floccose, 3–4-leaved. Radical leaves *ovate to ovate-oblong*, denticulate, roughly hairy on both sides, ciliate with longish white stiff hairs; cauline ovate-lanc. to lanceolate, often toothed, *pl. m. patent.* Panicle few-headed, irregularly *lax;* peduncles floccose, moderately setose, with a few hairs and *patent bracts;* invols. floccose, with some setæ and many black-based hairs; phyllaries rather broad subobtuse deep blackish green, even the margins rather dark. Ligules somewhat orange-yellow, tips puberulous, styles livid-yellow or livid. Plentiful in the Carnarvonshire hills, ranging from 500–2500 ft.

"*H. stenolepis* Lindeb. This species is closely connected with *H. britannicum* F. J. Hanb., but differs in the following particulars:—it usually has one stem-leaf; root-leaves oblong-lanceolate, very variable at the base, with stelligerous pubescence beneath; peduncles long and incurved; phyllaries still more attenuate into a long linear point. Of the Craig Cille *H. stenolepis* Mr. Hanbury rightly observes, 'A modification of the Scandinavian form' (B. E. C. Rpt. 1893, 417). The fact is, the British plant is a departure from the Scandinavian type towards *H. britannicum.*

"*H. angustatum* Lindeb. The type specimens are frequently branched from the base, and have subentire leaves. British specimens have more dentate leaves and are usually unbranched below. The Scotch series (No. 151) are in the direction of Lindeberg's var. *elatum*.

"*H. zetlandicum* Beeby *forma.* So named by the Rev. E. S. Marshall and confirmed by Mr. F. J. Hanbury, and recorded under this name in Journ. Bot. 1898, p. 172; and we issue it as such on their authority rather than our own. We have gathered the same form in Farr Bay, E. of Bettyhill, ourselves, as long ago as 1888, and cultivated it both at Bournemouth and Shirley, without being able to exactly determine it, but have not had *H. zetlandicum* in cultivation for comparison. It may be, as Mr. Marshall thinks, that an exposed mainland situation will account for the more abundant clothing of the involucre and robustness of the whole plant. But should not this circumstance have produced leaves more strongly dentate rather than (as it is) less so? Mr. W. H. Beeby, to whom we have submitted specimens, shares our doubt, but neither he nor we can suggest a better name."

BIBLIOGRAPHICAL NOTES.

XXVI.—FRANCIS BAUER'S 'DELINEATIONS OF EXOTIC PLANTS.'

IN a description of this work published in this Journal for 1899 (pp. 181–3) no reference is made to the authority which should be cited for the names of the Heaths figured, when these happen to be new. The matter has been brought under my notice in connection with *Erica sexfaria*, which is there published for the first time. There is no letterpress to the work, save for Banks's preface, but the name of each plant is printed on the plate, and this has been accepted as an adequate publication.

Salisbury (in Trans. Linn. Soc. vi. 334 (1802)) cites for *E. sexfaria* "Pl. Kew. f. 11"; in Aiton's Hortus Kewensis (ed. 2, ii. 364 (1811)) it stands as "Icon. hort. Kew. 11"; Bentham (in DC. Prodr. vii. 618 (1892)) has "Dryand.! in Bauer icon. pl. Kew. t. 11"; and Mr. Jackson in his *Index* has "Ait. Exot. Pl. t. 11." Bentham, who consulted the Banksian Herbarium when preparing his monograph, is undoubtedly right in supposing that Dryander is responsible for the name; it appears in his handwriting not only on the herbarium sheets, but on Bauer's original drawings for the work (nearly all of which are named by Dryander), and in Solander's MSS., where it is substituted for names previously given by Solander. Unfortunately Bentham's citations are not consistent; for *E. longifolia* (which is written up in the Herbarium in Dryander's hand) he cites "Ait. in Bauer icon. hort. Kew. t. 4), while the next species, *E. Leeana* (which is *not* written up by Dryander) is given as "Dryand. in Bauer icon. hort. Kew. t. 24."

Whether, however, Dryander can rightly be cited as the authority for these names must depend upon how far it is justifiable to go beyond the information which appears on the title-page of a book. This question is of importance in connection with Aiton's *Hortus Kewensis*, as to which something was said in this Journal for 1897, p. 481. In the present instance, however, the difficulty is increased by the fact that, as will be seen from the title-page of the work, reprinted in Journ. Bot. 1899, p. 181, and from the other information there given, Aiton had no part in it save in so far that he was the Curator of Kew Gardens, from which the plants figured were derived. It may of course be urged that the phrase "published by W. T. Aiton," taken literally, justifies the attribution of the "publication" to him, especially as there was another publisher in the ordinary sense of the word; and it is no doubt this last view which has induced Mr. Jackson to cite "Ait." as the authority, though in that case "Ait. f." or "W. T. Ait." would be more accurate.

JAMES BRITTEN.

NOTICES OF BOOKS.

Flora of Tropical Africa. Vol. V., Part iii. London: Lovell Reeve. 1900. Price 8s. net.

THIS part contains pp. 385–546, and was published last December; it completes the volume, and, with the exception of the Addenda (pp. 506–526), index (pp. 527–545), etc., is entirely the work of Mr. J. G. Baker; it contains the bulk—about five-sevenths—of the *Labiatæ*, as well as the seven species of *Plantago*, which are the only members of the *Plantagineæ* in the Flora. The authorship of the Addenda is not particularly stated, but from internal evidence it seems that the authors of the several natural orders which were elaborated in the volume contributed to the corresponding portions (if any) to the Addenda; thus, Mr. Burkill and Mr. C. B. Clarke to the *Acanthaceæ*, and Mr. Baker to the rest. There remains, perhaps, some doubt on this point; for on the last page of the Addenda *Solenostemon niveus* is taken up from the Welwitsch Catalogue, a species which was founded upon the same plant (*Welwitsch*, n. 5619) as had been described on p. 437 under the name of *Coleus orbicularis* Baker; and these two names are not correlated in the Addenda.

Botanists can now obtain in a systematic sense a comprehensive and concise survey of the *Labiatæ* of Tropical Africa with an ease that was not previously possible. The number of genera in this and in the latter portion of part ii. is given as 43; and the number of species is 571, of which 21 species are found only in the Addenda.

No new genus is here published for the first time, and the limitations of the genera are kept as close as possible to that settled in the *Genera Plantarum* by Bentham, who had devoted during many years a great deal of attention to the order, and the value of whose judgment in the matter of genera is universally acknowledged; several revisions made by recent authors are not adopted; and, as might have been expected, work done at Kew has received in some instances preferential treatment.

Five volumes of the Flora have now been published, and their dates are as follows: vol. i. in 1868, vol. ii. in 1871, vol. iii. in 1877, vol. vii. in 1897–98, and vol. v. in 1899–1900; so far as appears from them, *Labiatæ* stands fourth in number of species, the only larger numbers being 833 for *Leguminosæ* in 1871, 719 for *Orchideæ* in 1897–98, and 681 for *Acanthaceæ* in 1899–1900; the next largest numbers were 478 for *Rubiaceæ* in 1877, 473 for *Liliaceæ* in 1898, and 471 for *Compositæ* in 1877. But, having regard to the differences in the dates, to the progress made during the last twenty-three years, and to the more critical idea of a species which now prevails at Kew, there is no doubt that *Rubiaceæ* and *Compositæ* are each much more numerous in Tropical African species than are *Labiatæ;* and of the orders not yet done for the Flora it may be granted that *Gramineæ*, *Cyperaceæ*, and probably *Euphorbiaceæ* will have a higher enumeration than *Labiatæ;* it thus appears that *Labiatæ* really take a place not higher than ninth in the Flora.

As an illustration of the accelerated rate of progress in African botany, it may be stated that the orders *Umbelliferæ* and *Araliaceæ* were prepared for the second volume of the Flora, but were crowded out; they were, in fact, printed off in 1871, with the heading and pagination ready for the succeeding volume, and the sheets remained unpublished for more than six years, until in 1877 the third volume appeared, and then they formed the beginning of it. Notwithstanding this long delay, one only of the new species which were described in it had in the meantime been published under another name, and only one new species would have required incorporation in order to bring the work up to date.

The number of new species of *Labiatæ* now published by Mr. Baker is 122, besides 52 previously published by him; the number of species ascribed to Dr. Gürke is 121, and that to Dr. Briquet is 83, and there are several species due to other botanists of the present day, while only 25 are ascribed to Bentham, and 11 to Linnæus; it is thus seen to what a great extent the Flora is indebted to recent research. The number of endemic species appears to be 508, only 63 being mentioned as occurring also outside the limits of the Flora. It is obvious that much material remains unexplored and waiting to reward further search; for one of the six great divisions into which Tropical Africa is divided for the purpose of the Flora—namely, the North Central region—is not credited with even one species; this region is bounded on the north by the Tropic of Cancer, on the west by the Atlantic Ocean, on the east by the twenty-sixth meridian of east longitude, and on the south by the Upper Guinea region and the Congo Free State. As to the other five regions, Upper Guinea is cited for 63 species, Nile-land for 202, Lower Guinea for 124, South Central for 40, and Mozambique for 247.

The care that has been taken to bring together in regular sequence all the plants of the order belonging to the Flora cannot fail to prove a great benefit; it is indeed carrying out the main purpose of the work, and very little has escaped Mr. Baker. Two species, however, are omitted, namely, *Plectranthus hereroensis* Engl. Bot. Jahrb. x. p. 267 (9 Oct. 1888), and *Leucas Ruspoliana* Gürke in Engl. Bot. Jahrb. xxii. p. 134, n. 22 (19 Nov. 1895).

The following three names, which have been published in connection with Tropical African botany, are not quoted:—

Ocimum longistylum Hochst. in Pl. Schimp. Abyss. iii. n. 1599; this, according to Schweinf. Beitr. Fl. Æthiop. p. 125 (1867), is synonymous with *O. menthifolium* Hochst.

Salvia utilis A. Br. in Karlsrh. Saamenkat., 1841; this, according to Schweinf. *l. c.* p. 127, is synonymous with *S. nudicaulis* Vahl. In the National Herbarium there is a specimen from A. Braun, grown in the Carlsruhe garden from Abyssinian seeds.

Leonotis Raineriana Vis. L'Orto Bot. Padova, 1842, p. 142, n. 47; this is *L. velutina* Fenzl, β ? *Raineriana* Benth. in DC. Prodr. xii. p. 535 (1848).

It may be noted that on p. 477, n. 13, *Leucas Pechuelii* Baker should have been ascribed to Gürke in Engl. Bot. Jahrb. xxii. 135; also that on p. 481, n. 30, *L. lanata* Baker is not the same plant as the East Indian *L. lanata* Benth. in Wall. Pl. As. Rar. i. p. 62 (1830), and in DC. Prodr. xii. p. 525, n. 8 (1848), although Gürke in Engl. Bot. Jahrb. xxii. p. 135, n. 36, seems to assume that it is the same. It appears that *L. lanata* Baker will require a new name, but the question whether this is so or not may form a difficult problem in nomenclature, if certain principles now in fashion on the Continent or in America are allowed to prevail.

Ocymum monadelphum and *Leucas affinis* of R. Brown in Salt, Voyage to Abyssinia, Appendix iv. p. lxiv (1814), are names only, and as such have no claims for recognition; they are not noticed in the Flora, but the latter is quoted by A. Richard, Tent. Fl. Abyss. ii. p. 199 (1851), as synonymous with *L. urticæfolia* (printed *L. urticifolia* by Baker, p. 489). *Ocymum monadelphum* R. Br. is *Coleus comosus* Hochst. Specimens of each, named by Brown, are in the National Herbarium.

Without any attempt to supply a list of omissions of plants or names belonging to the other orders comprised in the volume, from the appendix, the curious want of any mention of the Somaliland genus, *Hæmacanthus* S. Moore in Journ. Bot. 1899, p. 63, t. 402 *c* (Sept.), may be noted. References in the appendix to the prior pages of the volume, showing where the added species belong, would have been a practical advantage. The change made in the trivial name of *Mimulopsis Thomsoni* C. B. Clarke, p. 55, which has the synonym *Epiclastopelma glandulosum* Lindau is obviously calculated to provoke a change of nomenclature on the part of foreign botanists and might have been wisely avoided, although the earlier trivial would not be very distinctive under the older generic name.

While appreciating its sterling value, it is impossible to look through the volume, even cursorily, without being impressed with the numerous and important contributions made by foreign botanists to this Flora; and these contributions are mostly of recent dates. From a purely scientific standpoint, it matters not at all to what nationalities workers belong; but the book is printed in English with the belief that this language would be most generally convenient; many of its readers therefore will feel a certain sense of shame that the plants of a part of the world where British rule and influence largely prevail are not systematically elucidated in corresponding proportions by English botanists. It must be conceded that supremacy in this kind of scientific work is being steadily lost by Britain; it is no longer adequate, as in former times, to rely much on voluntary efforts to cope with foreign competition; and, unless the British Government takes to heart the present tendency of things, organizes its botanical establishments to the highest state of efficiency, and enlarges the supplies, it will inevitably discover that the best original work on the botany of its colonies and other lands under its protection will, like many other good things, continue in ever increasing degrees principally to be made in Germany.

W. P. Hiern.

Algological Notices.

In *Nyt Magazin for Naturvidenskaberne* (Christiania) (Bind 38, Hefte i. 1900) appears a series of short notes by Dr. N. Wille, entitled "Algologische Notizen I.-VI." He introduces these notes by explaining that, during the twenty years and more in which he has paid attention to algæ, he has made observations which for some reason or another have remained somewhat fragmentary. These notes he has now decided to publish, since, as he rightly says, they may save trouble to other botanists, or may even incite someone to continue the investigation which from force of circumstances has been left unfinished by the author.

The first of the notes is on *Chloroglœa tuberculosa* (Hansg.), found by Dr. Wille on *Laminaria digitata* and *Rhodochorton Rothii.* He regards his plant as identical with *Palmella (?) tuberculosa* Hansg., recorded from the Adriatic, and describes both the mode of growth and the formation of akinetes or non-motile reproductive cells. He considers *Chloroglœa* to be one of the *Chamæsiphonaceæ*, allied to *Oncobyrsa*, and a diagnosis is given of the new genus.

Note II. describes a new variety—*Mandalensis*—of *Merismopedia elegans* A. Br. It differs from *M. elegans* var. *marina* Lagerh., its nearest ally, in the larger size of its colonies, which consist of larger and more irregular cells.

Asterocystis ramosa Gobi forms the subject of the third note. Dr. Wille obtained specimens of this alga at Mandal in the summer of 1889, and was able to determine the presence in the cells of a central pyrenoid in a star-shaped chromatophore. From lack of reagents for the staining of nuclei, he was unable to make these bodies visible, though he does not doubt their existence. The manner of cell-division is described, which gives rise in places to the false branching figured by Harvey, and found among families of the *Myxophyceæ.* Dr. Wille describes a certain condition of some of the cells, which leads him to suggest the formation of monospores not enclosed in a membrane; and this suggestion gains weight by a study of the mode of attachment to the plant on which it grows. The development of *Asterocystis* agrees so closely with that of the genus *Goniotrichum*, that it would be possible to unite the two; but Dr. Wille considers it wiser to retain both genera for the present, as he believes that *Asterocystis* may prove to have a resting-stage in the form of akinetes. He describes cells which may be these bodies, but the point requires more investigation. A short note on *Crucigenia irregularis* Wille adds a few details to the description already published by Dr. Wille on this plant.

Blastophysa arrhiza Wille forms the subject of Note V. The points of difference are enumerated which distinguish this species from *B. rhizopus* and *B. polymorpha*, described by Dr. Kjellman. Although the copulation of zoospores has not been actually observed in this species, Dr. Wille shows from his own observation and those of Dr. Huber that such a process is not unlikely to exist. As to the systematic position of *Blastophysa*, Dr. Wille entirely agrees with Dr. Huber in removing it from *Valoniaceæ* to the *Chætophoraceæ*, where he places it as a much reduced form next to *Phæophila*, notwithstanding the chromatophores and nuclei. In this course he is doubtless right.

The last note deals with *Spirogyra fallax* (Hansg.). This plant was found by Dr. Wille at Tempelhof, near Berlin, in 1882, and, though he recognized it as new, it remained unpublished. He regards it as identical with *S. insignis* Kütz. var. *fallax* Hansg., published some years later; but, as the description given by Dr. Hansgirg is not sufficiently full, a diagnosis is given here of the alga which is now raised to specific rank. *S. fallax* occupies an intermediate position in the genus *Spirogyra*, for, though it must be placed in the subgenus *Euspirogyra*, it resembles in certain respects *S. punctata* Cl. The special points described in each note are figured.

E. S. B.

The European Sphagnaceæ (after Warnstorf). By E. Charles Horrell, F.L.S. London: West, Newman & Co. 1901. Pp. 87. Price 2s. 6d.

The *Sphagnaceæ* are represented by a single genus which is sharply separated off from the rest of the Mosses by the peculiar spongy structure of its leaves and stems, and also by the morphology and development of its sporogonium, which are suggestive of a nearer descent from some Anthocerotoid ancestor than can be claimed for the other Mosses. Moreover, as in the case of other plants of promiscuous aquatic habit, the *Sphagna* present such a wealth of perplexing transition-forms as to render their classification an extremely difficult matter. It is not surprising, then, that they should have been made the subject of a separate and critical study. Of those who have devoted themselves to this study, the principal exponent is Dr. C. Warnstorf, of Neuruppin. But his work, published in numerous papers in German periodicals, has hitherto failed to meet with the recognition it deserves in this country. With the view of making it better known to English readers and of enabling them to bring up the tale of our native species to the standard of continental systematists, Mr. Horrell has undertaken the task of putting into English the latest determinations at which Dr. Warnstorf has arrived as to the disposition and delimitation of the species and varieties.

Dr. Warnstorf attaches great importance to the position and form of the chlorophyllose cells of the ramuline leaves as seen in cross-section, and also to the form and distribution of the pores of the hyaline cells. Hence success in the new Sphagnology is to be attained only by patient section-cutting. And as the multiplication of cryptogamous species usually varies in direct proportion with the magnification afforded by the powers of the microscope employed, we find a notable increase in the present group. Eighteen of the species given in Dr. Braithwaite's *Sphagnaceæ* are European. Dr. Warnstorf has increased them to fifty. How many of these are native to our country remains to be ascertained with the help of Mr. Horrell's synopsis.

Mr. Horrell has thrown himself into his task with ardour, and has performed it conscientiously. He has gone afield and collected; he has determined and revised thousands of specimens. He gives us a key to the species, detailed descriptions of the species and varieties, with their geographical distribution, a bibliography, and an index. The discrepancy between the number of species in the key and the number in the body of the book is explained by a note on p. 39. Whilst Mr. Horrell was publishing the instalments of his work in the pages of this Journal last year, he learned that Dr. Warnstorf had revised his conclusions as to the group *Cuspidata*. Consequently he had to introduce a revised key of this group, and to add the descriptions of eight more species.

It is to be regretted that a larger edition of separate copies of this useful book was not printed off. Of the 100 copies prepared, eighty have already been taken up by the Moss Exchange Club, and less than a score are left in stock.

A. G.

Xenia, or the immediate effects of Pollen in Maize. By Herbert J. Webber. U. S. Department of Agriculture, Bulletin no. 22. 8vo, pp. 44, 4 plates. Washington. 1900.

This paper deals in a most interesting manner with the phenomenon of "Xenia"—a term applied to the changes that are produced in seed by cross-fertilization. That the hybrid plant should be changed in character was to be expected, but that the seed, apart from the embryo, should be altered was difficult to understand, though there could be no doubt that there was very distinct alteration. It is only recently that this mysterious influence, or "Xenia," has been satisfactorily explained by the discovery of a double fecundation. Prof. Nawaschin and Prof. Guignard, working independently of each other, discovered this fact about two years ago, while working on the fertilized embryo-sac of *Lilium* and *Fritillaria*. They found that both the nuclei of the pollen-tube passed over into the embryo-sac; that one fused with the nucleus of the ovum, and the other with the definitive nucleus of the embryo-sac, and that the endosperm to which the latter nucleus gives rise is thus equally with the embryo the product of fertilization, and bears the impress of the male plant.

There is no plant, Mr. Webber goes on to state, in which the occurrence of Xenia is so well substantiated as in Maize, though double fertilization has not yet been observed in any of the cereals, and his conclusions are necessarily theoretical. The generative nucleus in grasses has, however, been noted and described as of spiral form, thus agreeing in form with the male nucleus in *Lilium Martagon* described by Prof. Guignard, and further confirmed by Miss Sargant.

Mr. Webber gives an historical account of the observations made on hybridization in Maize by various writers, beginning with P. Dudley's "An Observation on Indian Corn" (1724). This writer remarks that "Indian corn is of several colours, as blue, white, red, and yellow; if these sorts are planted by themselves, they will keep to their own colour. But if in the same field you plant blue corn in one row of hills, and the white or yellow in the next row, they will mix and interchange their colours; that is, some of the ears of corn in the blue-corn rows shall be white or yellow; and some in the white or yellow rows shall be of the blue colour." Succeeding investigators made experiments on Maize with the same result, that the influence of cross-fertilization could be seen in the endosperm of the seed, either as a change of colour or a change of form. It was also noted that the colour or form of the hybrid endosperm was affected only where the cross occurred with a plant of which the endosperm had had the same peculiarity. If the pericarp of the seed of the crossing plant alone was coloured, no trace appeared in the seed resulting from the cross-fertilization.

Another conclusion Mr. Webber draws from his experiments is, that though in every case change of endosperm or Xenia invariably proved that the seed was a hybrid, and that such change was a convenient check in plant-breeding experiments, yet the converse did not hold true; many seeds that showed no trace of Xenia proved to be hybrids. He concludes that in these cases double fertilization may not have taken place, and that the endosperm could thus bear only the characters of the female plant. Mr. Webber gives many examples in his excellent plates of the change in colour and form produced in corn by Xenia; he is to be congratulated on the way in which he has shown how recent discoveries tally with previous observations, so that what was once mysterious and incomprehensible becomes a simple statement of cause and effect.

A. L. S.

Handbook of Practical Botany. By Dr. E. Strasburger. Translated and edited from the German, with many additional notes, by W. Hillhouse, M.A., &c. Fifth edition, rewritten and enlarged. Pp. xxxii, 519, with 150 original and a few additional illustrations. London: Sonnenschein. 1900. Price 10s. 6d.

Dr. Strasburger's handbooks of practical botany are sufficiently well known, both in the German and English form. For the latter the English reading student owes a debt of gratitude both to the translator and editor, and to the publisher. Messrs. Sonnenschein, in the series of excellent and comparatively cheap botanical text-books, have done good service—the familiar chocolate-brown-covered volumes fill the chief place in the botanical library of the average advanced student who does not aspire to the more ambitious and more expensive green-backed translations issued by the Clarendon Press.

The present volume contains nearly one hundred pages more than the first English edition issued thirteen years before, and forty-four more illustrations. In its preparation full use has been made of the third edition of the *Botanische Praktikum*, which appeared in 1897. The notes added by the editor, which in previous editions have been indicated by bracketing, have now been for the most part incorporated in the text. Another alteration which will be observed is the omission of the bibliographical notes which have been hitherto appended to the chapters. The reason given that, "as the references were very largely to German sources, it follows that any who were capable of making use of them would be also capable of referring to them as set out at length in the German original," does not seem adequate. A student would not be likely to have both German and English editions of the manual, and, while naturally preferring the latter to work with, might at the same time be glad to have references to sources of more extensive information.

We would also suggest the inclusion of some more typical form than *Marchantia* in the study of the vegetative structure of the Liverworts—it is remarkable how difficult it is to oust a "type" which has once received the *imprimatur* of authority, though one cannot imagine that either author or editor restricts himself in practice to this extremely specialized and non-typical member of the group.

A. B. R.

The Self-Educator in Botany. By R. S. Wishart, M.A. 8vo, pp. xiv, 226, figs. 110. London: Hodder & Stoughton. 1900. Price 2s. 6d.

It would be interesting to see the kind of botanist evolved by the process of self-education set forth in this little manual. It is no worse than many others, and much better than some, but a man must indeed be a genius in exposition who can teach through the pages of a book the subject-matter which is nowadays comprised in an elementary course of botany, including internal structure and the principles of experimental physiology. And this is what the author attempts in the present instance. We would recommend the isolated student to begin with the macroscopic study of familiar flowers on the lines laid down by Professor Oliver in the earlier chapters of his *Lessons in Elementary Botany*, or to get such a book as that by Professor L. H. Bailey, reviewed in the February number of this Journal. We do not mean to insinuate that Mr. Wishart's book is full of mistakes, or badly written, but, candidly, we do not think the isolated student will get very far into it before he is pulled up. Nor are the illustrations especially helpful—they are almost without exception extremely crude, and some very bad, notably those depicting internal structure made "either from fresh preparations or from slides in the author's possession."

A. B. R.

*ARTICLES IN JOURNALS.**

Annuario R. Ist. Bot. di Roma (x. 1; received 7 Feb.). — R. Pirotta & E. Chiovenda, 'Flora Romana: Bibliografia e Storia.'

Bot. Gazette (21 Jan.). — C. S. Sargent, 'New or little known N. American Trees' (mainly *Cratægus*). — T. Holm, '*Eriocaulon decangulare*, an anatomical study.' — B. M. Duggar, 'Germination of Fungus Spores.'

Bot. Notiser (häft 1; 2 Feb.).—B. Lidforss, 'Några pall af psykroklini.' — R. Sernander, 'Om de buskartade lafvarnes hapterer.' —T. Hedlund, '*Ribes rubrum*.' — P. Dusén, 'Några viktigare växtfynd från nordöstra Grönland.'

Bot. Zeitung (16 Jan.).—L. Jost, 'Einige Eigenthumlichkeiten des Cambiums der Bäume' (1 pl.).

Bull. de l'Herb. Boissier (29 Dec. 1900).—E. de Wildeman & T. Durand, 'Plantæ Gilletianæ Congolenses.' — H. Christ, 'Fougères collectées pour le Dr. J. Huber au Bas-Ucayali et au Bas-Huallaga (Alto Amazones).' — H. & P. Sydow, 'Fungi novi brasilienses.'— J. Huber, 'Sur la végétation du Cap Magoary et de l'île de Marajo' (6 pl.).—G. Beauverd, *Stellaria nemorum* var. *saxicola*. — (30 Jan.). J. Brun, 'Diatomées du Lac Leman.' — T. Herzog, 'Zur Kenntnis der schweizer Laubmoosflora.' — F. Stephani, 'Species Hepaticarum.' — G. Hegl, 'Das Obere Tösstal und die angrenzenden Gebiete.'

Bull. Soc. Bot. France (xlvi. 9, not dated, received Dec. 1900). —C. A. Picquenard, 'Quelques *Parmelia* du Finistère.' — D. Clos, '*Agrostis dispar* Mich.' — (xlvii. 8; 31 Jan.). X. Gillot, 'Herborisation à Souk-el-Khemis, Tunisie.' — E. Heckel, 'Plantes médicinales et toxiques d'Afrique.'—M. Gandoger, 'Flore de la Tasmanie.' —Id., 'Flore d'Islande.' — H. de Boissieu, 'Plantes du Japon' (Violariées, etc.). — J. E. Neyraut, '*Erica Watsoni*, *Tetralix* et *ciliaris*.' — F. Gagnepain, *Triplostegia grandiflora* & *Streptolirion longifolium*, spp. nn. (China; 2 pl.).—Id., 'Plantes rudérales parisiennes.'

Bull. Soc. Roy. Bot. de Belgique (2 Feb.). — V. Mouton, 'Ascomycètes nouveaux ou peu connus' (1 pl.).—J. Goffart, 'Les organes de sudation.' — C. Van Bamkerke, '*Coccobotrys xylophilus*.' — Id., *Lepiota Meleagris* (1 pl.). — E. Laurent, 'La greffe de la pomme de terre.' — T. Durand & E. de Wildeman, 'Matériaux pour la Flore du Congo.'

Bulletin Torrey Bot. Club (31 Jan.).—E. G. Britton & A. Taylor, 'Life-history of *Schizæa pusilla*' (6 pl.). — P. A. Rydberg, 'Rocky Mountain Flora.' — C. V. Piper, 'New Northwestern Plants.'— L. M. Underwood, *Adiantum modestum*, sp. n. (N. Mexico).—T. D. A. Cockerell, *Sophia andrenarum*, sp. n. (N. Mexico).

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Gardeners' Chronicle (2 Feb.). — *Phajus tuberculosus* (fig. 31).—(9 Feb.). J. Weathers, *Cynorchis purpurascens* (fig. 37).—(16 Feb.). J. Hoog, *Iris paradoxa* var. *Choschab* (fig. 45). — J. Weathers, *Impatiens grandiflora* (fig. 47).

Malpighia (xvi. fasc. 5-8; dated 1900, received 21 Feb.). — T. Ferraris, 'Flora Micologica del Piemonte.' — G. Cecconi, 'Contribuzione alla conoscenza delle galle.' — O. Mattirolo, 'Fungi hypogæi.' — L. Montemartini, 'I nodi delle Graminacee.' — S. Belli, 'Le Festuche italiane.' — G. B. Petrucci, 'Richerche anatomiche sopra la *Chamærops humilis*,' etc. (6 pl.). — E. Mastel, 'Unità morphologica del fiore delle Crociflore.'

Oesterr. Bot. Zeitschrift (Feb.). — V. Schiffner, 'Über *Morckia* und *Calyicularia*.'—S. Prowazek, '*Polytoma*' (1 pl.).

Rhodora (Feb.). — C. S. Sargent, 'Notes on *Cratægus*.' — E. Brainerd, *Scirpus atratus* = *S. Peckii*.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on Jan. 17th, Mr. C. T. Druery exhibited a supposed hybrid between *Ceterach officinarum* and *Scolopendrium vulgare*, which he had received from Mr. E. J. Lowe. The fronds were of somewhat foliose *Ceterach* form, but entirely devoid of scales, and with the upper third confluent, resembling the tip of a *Scolopendrium*-frond, the fructification partly Scolopendroid and partly Asplenoid. From this combination of characters, the exhibitor considered the plant to be a true hybrid between the species named. Mr. C. H. Wright exhibited numerous herbarium specimens of *Scolopendrium vulgare*, *Ceterach officinarum*, *Asplenium marinum*, *A. Hemionitis* (*palmatum*), and *Scolopendrium nigripes*, by which last three species it was demonstrated that *sori* in faced pairs (*Scolopendrium* type) may not only appear on species classed as *Asplenium*, but that, on the other hand, simple Asplenoid *sori* may exist on species classed as *Scolopendrium* (e.g. *S. nigripes* and *A. Hemionitis*). Mr. Wright was inclined to the opinion that the presumed hybrid was merely a form of *A. marinum*, basing his opinion partly on the leathery nature of both *S. vulgare* and *Ceterach* fronds as contrasted with the thin papery texture of the exhibits. He entered at some length into the various modes of attempting cross-fertilization in Ferns; but the factors of uncertainty are so difficult to eliminate, that, until some delicate means have been devised for the actual transference by hand of individual antherozoids to alien archegonia, hybridity in Ferns can hardly be scientifically proved. Mr. Druery, in reply, considered that the Kew examples demonstrated that a far closer alliance existed between *S. vulgare* and the *Asplenia* than appeared on the surface, the presumed generic line between the forms of fructification being broken through, and hence the possibility of hybridizing. He also pointed out that, as *A. marinum* had also very leathery fronds, this argument *per contra* failed. One of the specimens of *A. marinum* exhibited with Scolopendroid *sori* in quantity, found in France, might also, he considered, possibly be a natural hybrid with *S. vulgare*, especially as its fronds and some pinnæ were peculiarly forked, dilated, and irregularly abnormal; while it is well known that the two species are often closely associated in their habitats, so that their spores might easily mix.

At the meeting on Feb. 7th, the President, Prof. S. H. Vines, while demonstrating the property possessed by certain vegetable liquids, such as coco-nut milk, and the juice of the pineapple and the potato, to cause the oxidation of guaiacum tincture in the presence of hydrogen peroxide, a blue colour being produced, drew attention to the recent researches of Raciborski on the subject. Raciborski has made the interesting discovery that certain tissues of the plant-body, more particularly the sieve-tubes and the laticiferous tissue, contain some substance, to which he gives the name *leptomin*, which likewise causes guaiacum to turn blue in the presence of hydrogen peroxide, and has gone on to infer that this leptomin may be regarded as discharging in the plant a function analogous to that of hæmoglobin in the animal body. It was urged, against this assumption, that, although both leptomin and hæmoglobin give the guaiacum reaction, yet this fact does not prove that leptomin can combine with oxygen, and can act as an oxygen-carrier in the organism, in the manner which is so characteristic of hæmoglobin; and that therefore the suggested analogy between the two substances is at least premature.

Mr. Carruthers, as consulting botanist of the Royal Agricultural Society of England, has recently reported on a fungoid disease of the leaves and fruit of cherry-trees. This report has been issued as a leaflet by the Society. The fully-developed fungus, *Gnomonia erythrostoma*, belongs to the group of *Pyrenomycetes*. It makes its appearance in spring on the young green leaves, causing yellow spots, which gradually increase in size. On these spots small perithecia are formed, containing long curved stylospores, which further spread the disease. The cherries are attacked at the same time as the leaves, and rendered unfit for market. The diseased leaves die early, and remain attached to the branches during the ensuing winter. Towards early summer the perfected form of the fungus, a round black perithecium that tapers up into a beak, is developed on the dead leaves, and produces the ascospores which reinfect the young leaves. The early death of the leaves and the consequent want of nourishment causes the branchlets to become dwarfed, the internodes between the leaf-bases being scarcely developed. Mr. Carruthers has followed Prof. Franke, of Berlin, who has carefully studied the fungus, in his diagnosis of the disease and in the remedy recommended. The dead leaves should be plucked and burned before the new foliage has begun to grow, and thus the source of infection would be removed. This would doubtless be a troublesome and expensive procedure, but it commends itself by its thoroughness and simplicity. It is in the orchards of Kent that the disease has appeared during the last few years, and it has already spread widely.

We are glad to learn that the rumour that only German botanists were to be engaged on Prof. Engler's *Das Pflanzenreich* is incorrect. The elaboration of *Naias* for that work has been entrusted to Dr. Rendle.

Mr. A. A. Heller has issued a second edition of his *Catalogue of North American Plants North of Mexico*, exclusive of the lower cryptogams, which brings the enumeration up to Nov. 10, 1900. It is arranged in accordance with Engler and Prantl's *Pflanzenfamilien*, the author being of opinion that "the universal acceptance of the change from the obsolete arrangement of Bentham and Hooker" is "understood by all." The work of recent describers and nomenclaturists is fully recognized, as may be gathered from the fact that on one page (171), out of 79 numbered names, 60 are assigned to Prof. E. L. Greene, and 7 to Mr. Aven Nelson. Mr. Heller, finding that "a number of new combinations would have to be published in order to secure uniformity of treatment," prefaces his work with five pages of them: these subsequently appear in the body of the book with the name "Heller" appended. It seems to us that such alterations should be reserved for a work other than a mere list of species, such as is this Catalogue, even supposing such changes ultimately to be necessary. The work is well printed on one side of the page, the other being left for additions and corrections. It would be well in future editions to print the name of the order and the genus at the head of each page, as is done in the British Museum publications. No publisher's name appears on the title-page.

The first number of his *Muhlenbergia*—a new journal which, with commendable frankness, Mr. Heller announces as "issued at irregular intervals"—is entirely devoted to further changes in nomenclature, and indeed is "issued somewhat prematurely" in order to make room for them. These changes "were crowded out of the *Catalogue*, enough space not having been provided in that work to accommodate all of them." We are entirely in accord with Mr. Heller in thinking that "the bare citation without discussion in most cases is undesirable"; and if "lack of time forbids a more extended treatment of the different species under consideration," we do not think botanical science would suffer were the changes postponed until they could be properly investigated.

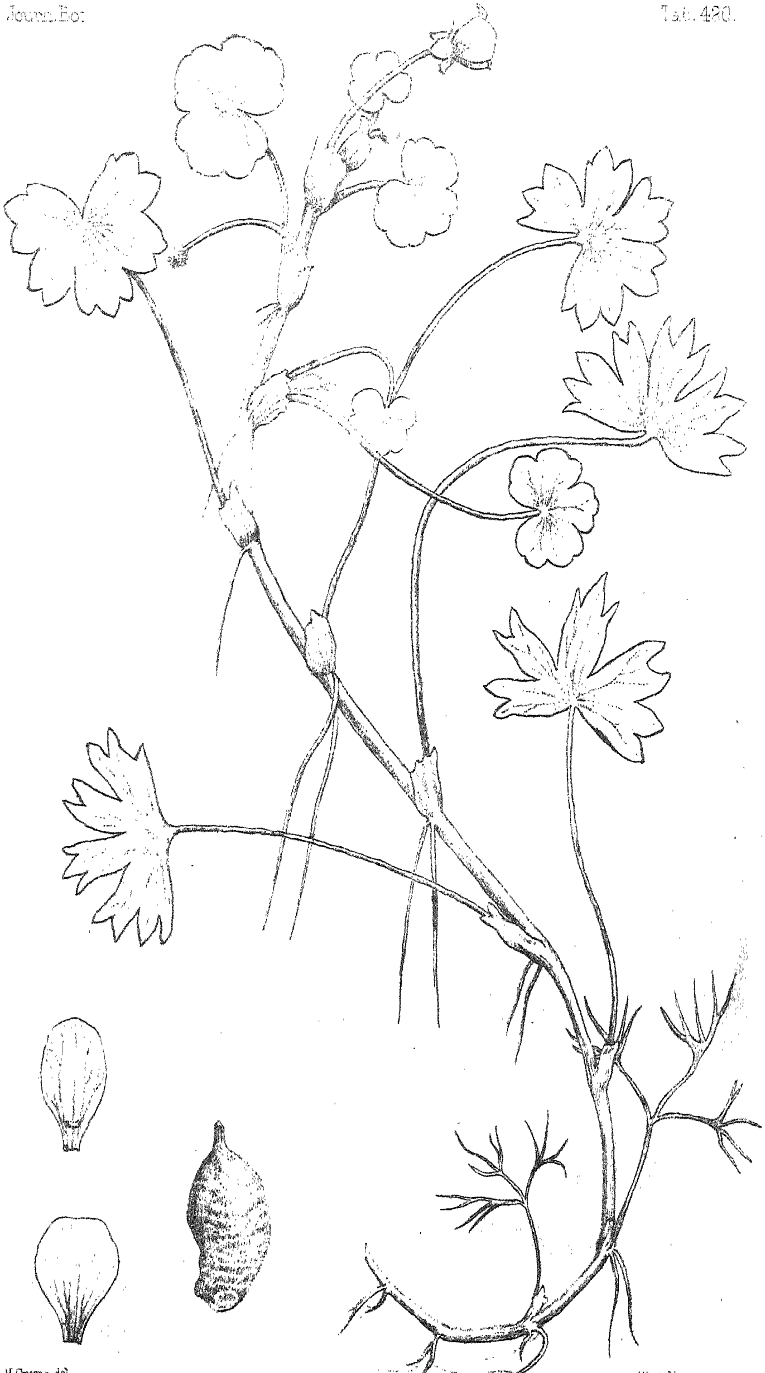
The activity of our transatlantic friends is manifesting itself in the establishment of botanical magazines, often small ones, in various centres. The latest is *Torreya*, "a monthly journal of botanical notes and news edited for the Torrey Botanical Club by Marshall Avery Howe." It is dated January, but did not reach us until early in February. There are short papers on *Rudbeckia hirta* by Dr. Britton, on seedlings of *Arisæma* by D. T. MacDougal, and on *Lycopodium* by F. E. Lloyd, and others. The number contains sixteen pages.

Mr. Stanley Coulter, in his *Catalogue of the Flowering Plants and Ferns indigenous to Indiana* (from the 24th Annual Report of the Department of Geology and Natural Resources of Indiana), commendably abstains from increasing synonymy, and is content to follow Messrs. Britton and Brown in the matter of nomenclature. There are no descriptions, but the distribution of each species is traced through the State, with useful notes on such as are either valuable or detrimental, with local names and (unfortunately) "popular" names manufactured after the manner frequent in English books. There is an introduction in which the economic value of some species and the poisonous nature of others are treated in separate essays; a good bibliography and a full (single) index add to the value of the work, which impresses us as distinctly useful and well done throughout.

The seventh part of MM. de Wildeman & Durand's handsome *Illustrations de la Flore du Congo* has been issued. It contains twelve plates, representing species of *Copaiba*, *Thomandersia*, *Oncinotis*, *Pterocarpus*, *Peristrophe*, *Duvernoya*, *Artabotrys*, and *Hibiscus*. The plates, by MM. B. Herincq, C. Cuisin, and A. d'Apréval, are admirably executed; they are printed in Paris.

The second part of the Flora of Koh Chang, reprinted from the last issue of the *Botanisk Tidsskrift* (vol. xxiii.), contains an account of the *Corallinaceæ* of this district by Dr. Foslie. The number of species is small, but, as the author justly remarks, the interest of the collection lies in the geographical distribution. Of the ten species enumerated, three were determined by Major Reinbold—*Dermatolithon pustulatum*, *Amphiroa fragilissima*, and *Corallina tenella*; and among the remaining seven species, there are three new species and three new varieties. The forma *funafutiensis* of *Lithothamnion Philipii* is raised to the rank of a species and given a variety of its own, to represent the form of the plant found at Koh Chang. Dr. Foslie's work in this, as in his other papers, is calculated to ease the task of anyone who in the future shall monograph the *Lithothamnion* group; for, by noting and describing the slight differences between closely allied species, he supplies the connecting links between the forms. Unfortunately, however, this system must lead to a large increase in future synonymy.

To Sir W. T. Thiselton-Dyer. —With reference to the editorial notes contained in the *Journal of Botany* for January, 1901, pages 47 and 48, reflecting on you and your work in connection with the preparation of the *Flora of Tropical Africa*, I desire to offer to you an expression of my sincere regret for the same. The preparation of the *Flora of Tropical Africa* was not committed to you until the year 1891, and my statement that it has been in your hands since 1872 is incorrect. I sincerely apologize to you for having imputed to you unnecessary delay in its preparation, and I desire to withdraw all reflections and imputations affecting you of every kind whatever contained in the editorial notes referred to.—James Britten.



M. Groves del.
B. Alcock lith.

West, Newman imp.

Ranunculus Hiltoni X. H.& J.G.

A NEW HYBRID WATER RANUNCULUS.

By H. & J. Groves, F.L.S.

Plate 420.

Some years ago we received from Mr. T. Hilton a curious water Ranunculus, collected by him at Copthorne Common, East Sussex. The upper leaves and the heads of carpels resembled those of *R. Lenormandi*, but the lower leaves were much divided though not capillary, while in stature, and the shape and size of the flowers, it resembled a small state of *R. peltatus*. Our first impression was that it must be a hybrid between these two species, but the presence of some well-developed heads of fruit seemed to militate against this view, and we did not feel that there was sufficient evidence to come to a conclusion, so put it aside among the many puzzles in this group, to await further material for solution.

On the 23rd of May of the present year Messrs. C. E. Salmon and James Groves visited the locality, duly found the plant, and collected a series of specimens. It occurred somewhat sparingly in a rather muddy stream in company with *R. Lenormandi* and a fairly typical form of *R. peltatus*, but generally in deeper water than the former.

On examining a number of fruiting heads we found that a considerable proportion of the carpels were undeveloped, and this being the case, taken in conjunction with the facts that the plant occurs in small quantity in company with both of the supposed parents, and that it possesses some of the distinguishing characteristics of each of them, we cannot resist the conclusion that it is a hybrid between *R. Lenormandi* and *R. peltatus*. The plant is so distinct and remarkable that we think it desirable to describe and figure it.

R. Hiltoni, hibr. nov. (*R. Lenormandi* × *peltatus*). Stem rather stout, rooting at many of the nodes; lower submersed leaves stalked, once or twice trifurcate, with linear acute (not capillary) laciniæ; upper long-stalked, mostly semicircular-reniform, trifid (sometimes tripartite), segments cuneate, deeply 3–5-lobed, lobes mostly acute; floating leaves rather coriaceous, cordate-orbicular, with 3 rounded lobes, the central lobe entire, or with two notches, the lateral with 1 deep and 2 shallow notches; stipules large, lower acute, upper broad rounded; peduncle stout, usually longer than the subtending petiole, recurved with fruit; sepals ovate reflexed; petals obovate, claw but slightly yellow, nectary cup-shaped, or wanting; stamens about 12–14; carpels about 40, glabrous or slightly hairy, distinctly keeled, inner edge rounded towards the top.

Discovered in April, 1896, by Mr. T. Hilton, in a stream on Copthorne Common, East Sussex.

R. Hiltoni resembles *R. Lenormandi* in its rooting habit, the shape of the floating leaves, the number of stamens, and the usually glabrous carpels with rounded inner edge; while it approaches *R. peltatus* in the shape and size of the petals and the hairy receptacle. In the submersed leaves it is unlike both species, for in *R. Lenormandi* all the leaves are nearly uniform in shape and texture, and in *R. peltatus* the submersed leaves are repeatedly divided into capillary segments, and there are rarely any leaves of a transitional character; whereas in *R. Hiltoni*, while none of the submersed leaves are truly capillary, almost all of them are transitional in character, some of the specimens—that figured, for instance—presenting a series of gradations from the repeatedly and very deeply divided lowest leaves with linear segments to the cordate-orbicular floating leaves.

NOTES ON AFRICAN STERCULIACEÆ.

By Edmund G. Baker, F.L.S.

The following notes have been made during a revision of the African *Sterculiaceæ* at the British Museum with Dr. Schumann's recently published Monograph.*

Melhania.

Of this genus twenty-five species are described. There seems confusion with regard to *M. griquensis* Bolus and *M. Rehmanni* Szyszyl. In Journ. Bot. 1898, p. 5, I indicated that I thought these species identical; but Dr. Schumann expresses his disagreement with this view, and places them in different groups. *M. griquensis* was established by Mr. Bolus in Journ. Linn. Soc. xxiv. p. 172 (1887), on Burchell no. 2050, from Kloof Village, Asbestos Mountains, and on a plant from Griquatown, *Mrs. Orpen*, Herb. Bolus, no. 6045. Mr. N. E. Brown in a note (*l. c.*) added several plants, among them *Rehmann* no. 5220. Dr. Schumann, in *Plantæ Marlothianæ* (Engler, Bot. Jahrb. x. p. 41, July, 1888), subsequently described as *M. griquensis* Bolus, *Marloth* no. 1132, from West Griqualand; but neither here nor in his monograph does he cite any other plants upon which Bolus himself established his species. I have carefully re-examined *Burchell* no. 2050 at Kew, and still consider it inseparable from *M. Rehmanni*. The bracts of the epicalyx in Burchell's specimen are not, however, linear-subulate, but ovate. *Rehmann* no. 5220, the type of *M. Rehmanni*, is among the plants referred to *M. griquensis* by Mr. Brown in his note additional to Mr. Bolus's original description.

Dr. Schumann does not retain *M. Burchellii* DC. The type is *Burchell* no, 2417, and is in the Kew Herbarium; the leaves are much broader than in *M. prostrata* DC.—the lamina is 7–9 cm. long and 7 mm. to 2 cm. broad, and closely tomentose above, not glabrescent. *M. Damarana* Harvey, a species omitted from my enumeration in Journ. Bot. 1898, pp. 4–6, apparently belonging to § *Broteroa.* is omitted by Dr, Schumann.

---

* *Monographieen afrikanischer Pflanzen-Familien und -Gattungen.* Herausgegeben von A. Engler. V.—Sterculiaceæ Africanæ. Bearbeitet von K. Schumann. Leipzig: Engelmann. 4to, pp. 140, tt. xvi.

The following species are apparently undescribed:—

M. (Broteroa) **Taylori,** sp. nov. Frutex ramos plus minus numerosos emittens novellis tenuiter subtomentosis deinde glabratis; foliis petiolatis late ovatis vel ellipticis basi rotundatis vel subcordatis quinque- vel subseptem-nerviis serratis utrinque tomentellis subtus paulo pallidioribus; stipulis linearibus; floribus sæpissimine geminatis axillaribus; pedicellis quam pedunculis brevioribus subtomentosis; bracteolis lanceolatis acuminatis mox recurvatis tomentosis quam sepalis brevioribus; sepalis similibus, lanceolatis acuminatis; petalis sepala paulo superantibus; staminodiis linearibus quam petalis manifeste brevioribus stamina superantibus; capsula extus tomentosa seminibus circa 4 pro valva. Species ad *M. rotundatam* Hochst. valde affinis.

Hab. East Equatorial Africa; Freretown, *Rev. W. E. Taylor.* In flower and fruit, Dec. 11, 1885.

Shrub with branches at first subtomentose, then glabrous. Leaves petiolate, oval or elliptical, subtomentose on both sides, rather lighter coloured below, smaller altogether and broader in proportion to length than those of *M. rotundata* Hochst., to which species the plant is closely allied. Lamina of largest leaf on specimen examined is 3·5 cm. long by 3 cm. broad; petiole 2 cm. long. Flowers axillary, geminate, peduncle subtomentose, ± 3·5 cm. long, pedicels ± 1 cm. long. Bracts lanceolate, tomentose, reflexing at an early stage, nearly 1 cm. long (measured in young fruiting stage). Sepals tomentose externally, lanceolate, acuminate, ± 1·2 cm. long. Petals ± 1·1 cm. long. Style glabrous. Filaments of stamens 1·5 mm. Anthers 2 mm. Staminodia ± 7 mm. Capsule externally tomentose, not pointed as in *M. rotundata.* Loculi generally 4-seeded.

M. (Broteroa) **albicans,** sp. nov. Fruticulus ramos plus minus numerosos et adscendentes emittens novellis confertim argenteo- vel subcinereo-tomentosis; foliis breviuscule petiolatis oblongis vel oblongo-oblanceolatis utrinque confertim argenteo- vel subcinereo-tomentosis subtus pallidioribus apicem versus serratis; stipulis filiformibus; floribus solitariis vel binis vel ternis; bracteolis lanceolatis quam sepalis paulo brevioribus argenteo-tomentosis; sepalis lanceolatis acuminatis; petalis sepala paulo superantibus; staminodiis linearibus quam staminibus duplo longioribus, filamentis brevibus; ovario globoso hirsuto loculis pluriovulatis.

Hab. Transvaal; Pilgrim's Rest, *Rev. W. Greenstock,* 1879.

Shrub branching, young branches and leaves covered with a close silvery or subcinereous tomentum. Leaves oblong or oblong-oblanceolate, cuneate at the base, margin more or less serrate towards the apex, lateral nerves inconspicuous above, more conspicuous below, lamina 2·5–3·3 cm. long, 1–1·5 cm. broad, petiole 5–7 mm. long. Stipules linear. Bracts lanceolate, externally tomentose, shorter than the sepals, ± 8 mm. long, 2 mm. broad at broadest point. Sepals lanceolate-acuminate. nearly 1 cm. long.

Petals just longer than the sepals, ± 1 cm. long. Staminodia linear, about twice the length of the stamens, 5 mm. long. Stamens about 2·5 mm. long. Stigmas triangular, flat, recurved; style somewhat hairy. Ovary globose, covered with white hairs. Loculi about 6-seeded. The species is allied to *M. Randii* Bak. fil.

M. (EUMELHANIA) **apiculata**, sp. nov. Frutex ramis lignescentibus gracilibus teretibus superne subtomentosis et aliquantulum lepidotis; foliis modice petiolatis in speciminibus nostris parvis anguste oblongis utrinque cinereo-tomentosis subtus pallidioribus basi rotundatis vel subcordatis marginibus integris; bracteolis late ovatis cordatis acutis extus subtomentosis et aliquantulum lepidotis quam sepalis brevioribus; sepalis lanceolatis apiculatis; staminodiis quam staminibus paulo brevioribus angustissime oblanceolatis; ovario tomentoso; stylo glabro; stigmatibus recurvatis; capsulis externe tomentosis loculis polyspermis seminibus glabris brunneis rugulosis.

Hab. Fort Dauphin, Madagascar, *J. Cloisel*, no. 3. "*Akata maimbo;* arbuste à fleurs jaune et à fonds rouge."

Shrub with terete, woody branches, the ends subtomentose and somewhat lepidote. Leaves on specimen examined only reached a length of 2 cm., cinereous-tomentose, paler below, petioles 4–5 mm. long. Flowers axillary, peduncles short, 5–8 mm. long. Bracts ovate-cordate, externally cinereous tomentose and somewhat lepidote, in the flowering stage ± 7 mm. long, and about the same breadth. Sepals lanceolate, tomentose and somewhat lepidote externally, with an apiculus which sometimes measures rather more than 3 mm. long. Filament ± 3 mm. long, anthers 1·5 mm. long. Style 2·5–3 mm. long; style-arms 5, recurved. Loculi 6- or perhaps more seeded. Seeds brown, rugulose, glabrous. Allied in some respects to *M. Steudneri* Schwf., but the bracts are acute, not acuminate.

I have not seen specimens of *M. corchorifolia* Baill., from between Manoumbe and Mouroundava, the leaves of which are described as 10 cm. long and the fertile stamens as 10.

DOMBEYA.

In this genus Dr. Schumann enumerates and characterizes thirty-nine species from Africa and the Comoro Islands. The species are divided into two subgenera, EUDOMBEYA (K. Schum.) having a 5-locular ovary and 5 styles, and XEROPETALUM (Planchon, emend. K. Schum.) is diagnosed as having a 3-locular ovary and 3 styles. The character of the latter subgenus must undergo a slight alteration, as in *D. Kirkii* Masters 2-styled flowers will be found. In connection with this plant there appears to be some confusion. Dr. Masters founded the species on two gatherings, one collected in lat. 16° S. by Dr. Meller, and another at Lupata by Sir John Kirk. In the former there are certainly for the most part only 2 styles and a bilocular ovary, and an inflorescence in which the flowers on the branches are racemosely arranged. The plant from Lupata has 3 styles. Dr. Schumann places with these under *D. Kirkii* a specimen from the Nyika Country, collected by Rev. T.

Wakefield, and one from the Duga Station, *Holst* no. 3180. In these latter the flowers are smaller, the calyx is very pilose, and the leaves are a different shape—*i. e.* they are broadest one-third from the apex, whilst in the true plant they are broadest about one-third from the base.

There is much similarity between the true *D. Kirkii* Masters and *D. laxiflora* K. Schum., and it will be for future monographers to determine whether these species are not synonymous.

D. pulchra N. E. Brown and *D. viburniflora* Bojer are omitted. The former is a plant of the subgenus *Eudombeya*, its alliance being perhaps with *D. Burgessiæ* Gerrard. It is a handsome shrub 5–8 ft. high, from Rimer's Creek, Barberton, *E. E. Galpin* no. 804. It differs from *D. Burgessiæ* in having very discolorous leaves. The latter is from the island of Johanna, Comoro Islands, and has close affinities with *D. bracteopoda* K. Schum.

Difficulties have been found in locating certain species in the series. *D. Johnstoni* Baker is a plant of the subgenus *Eudombeya* with flowers about the size of *D. Burgessiæ* Gerr. The style is hairy, and it will require careful comparison with *D. lasiostylis* K. Schum, *D. tanganyikensis* Baker also belongs to *Eudombeya*—the style is hairy below, and the flowers about the size of those of *D. Buettneri* K. Schum. *D. cuanzensis* K. Schum. must come next to *D. huillensis* K. Schum., and has been correctly placed in *Xeropetalum*. There are two gatherings of the latter in the Kew Herbarium by H. H. Johnston—one from Humpata, Chella Mts., Angola, Sept. 1883, and another from Cunene.

D. (XEROPETALUM) **Taylori,** sp. nov. Frutex vel arbuscula? ramis teretibus novellis subpilosis; foliis modice petiolatis obovato-ellipticis margine irregulariter serratis basi cordatis vel subcordatis sæpissime septemnerviis subcoriaceis apice acutis utrinque pilis stellatis inspersis subtus reticulato-nervosis; stipulis caducissimis; inflorescentia coetanea paniculata axillari pedunculata pedunculis pedicellisque patentim griseo- vel subbrunneo-pilosis, pedicellis subcapillaceis; sepalis lanceolatis extus pilosis quam petalis brevioribus; petalis modice obliquis, andrœcio quam petalis breviore; stigmatibus 3 recurvatis, ovario albo-tomentoso.

Ad *D. umbraculiferam* K. Schum. valde accedens.

Hab. Mombas Island, *Rev. W. E. Taylor*, 1886.

This plant bears close relations also with *Holst* no. 3180, from the Duga Station, and with a specimen collected by Rev. T. Wakefield at Nyika, but it differs in both leaves and inflorescence from *D. Kirkii.*

Shrub or small tree? Leaves petiolate, subcoriaceous, obovate-elliptic, the broadest part being about one-third from the apex, margin irregularly serrate with stellate hairs on both sides, veins reticulated beneath much more strongly than in *D. umbraculifera* K. Schum., lamina 4–4·5 cm. long, 2·5–3 cm. broad, petiole ± 1·5 cm. Inflorescence compact, many-flowered. Peduncles and pedicels with patent grey or brownish hairs; pedicels capillary. Sepals lanceolate, subacuminate, externally pilose, rather more than half as long as corolla. Petals ± 8 mm. long, ± 4 mm. broad at broadest part, moderately oblique. Staminodes linear, slightly broadening towards apex, longer than the stamens, which, however, have rather long filaments. Ovary hairy externally. Stigmas 3, recurved. Style sparingly pilose. Ripe capsule not seen.

HERMANNIA.

Under this genus Dr. Schumann characterizes four subgenera—*i. e.* (1) *Marehnia*; (2) *Euhermannia*; (3) *Mahernia*; (4) *Acicarpus*—the diagnostic characters depending on the nature of the filament, the inflorescence, and whether the capsule is horned or destitute of these appendages. The genus *Gilesia*, described by Baron von Mueller from South Australia, constitutes a fifth subgenus between *Marehnia* and *Euhermannia*. The filaments are filiform-linear—the anthers somewhat hastate, bifid at the apex; the peduncles axillary, and the flowers usually geminate. *Corchorus longipes* Tate in Trans. Roy. Soc. South Australia, vol. xxii. p. 119 (1898), belongs also to the subgenus *Gilesia*. It is identical with *Hermannia Gilesii* F. v. M. (= *Gilesia biniflora* F. v. M.).

H. (MAREHNIA) **Donaldsoni**, sp. nov. Suffruticosa ramosa ramis teretibus novellis sparsissime stellato-tomentellis deinde glabratis; foliis modice petiolatis, petiolo cano-subtomentoso tereti, oblongo-lanceolatis cinereo-viridibus basi rotundatis subdiscoloribus subtus paullo pallidioribus apice obtusis vel acutiusculis, stipulis oblique ovatis acutis basi rotundatis caducis; floribus in paniculas terminales et axillares dispositis pedunculatis et pedicellatis; bracteolis et bracteis filiformibus; calyce turbinato in lacinias lanceolato-acuminatas diviso; petalis calycem subæquantibus glabris; antheris ciliolatis quam stylo paullo brevioribus, filamentis exappendiculatis glabris; ovario sessili tomentoso quinquelobo; stylo glabro.

Species ad *H. exappendiculatam* K. Schum. valde affinis differt imprimis foliis angustioribus, paniculis angustioribus, floribus minoribus, calycis segmentis lanceolatis et petalis calycem subæquantibus nec distincte longioribus.

Hab. Reshiab, Somaliland, *Dr. A. Donaldson Smith*, no. 395. In flower, July, 1895.

Suffruticose, branches terete, sparsely and minutely stellately hairy. Leaves green, cinereous, petiolate, oblong-lanceolate, much narrower than in *H. exappendiculata* K. Schum., petiole of upper leaves ± 6 mm. long, lamina of upper leaves ± 3·5–3·7 cm. long, 1–1·2 cm. broad, margin serrulate, base rounded, veins conspicuous on the under side. Stipules obliquely ovate. Panicles axillary, terminal, narrower than in *H. exappendiculata* K. Schum. Flowers smaller than in *H. exappendiculata*. Calyx ± 6 mm. long, laciniæ lanceolate, acuminate, ± 3·5 mm. long. Petals subequal in length to calyx, a little shorter than the style, apiculate, narrowly obovate, almost 6 mm. long, erect. Anthers ciliolate, filaments perhaps half length of anthers, glabrous. Style filiform, glabrous. Ovary tomentose, 5-lobed, Ripe capsule not seen.

H. Eenii, sp. nov. Suffruticosa, caulibus elongatis florentibus simplicibus teretibus stellato-asperis; foliis petiolatis, petiolo pilis stellatis hispido, ovatis vel ellipticis fere glabris nerviis exceptis, apicem versus serratis basi rotundatis concoloribus; stipulis anguste lanceolatis quam petiolis brevioribus; floribus solitariis axillaribus, pedunculis quam foliis nunc longioribus nunc brevioribus; bracteolis binis vel ternis; calyce in lacinias lanceolato-acuminatas diviso; petalis quam calyce brevioribus oblongo-ovatis; staminibus quam petalis longioribus; stylo quam antheris longiore; capsula angustata vix cornuta.

Hab. Dammaraland, *T. G. Een*, 1879.

Branches elongate, flowers distributed along the branches as in *Hermannia brachypetala* Harv., to which species this plant bears considerable resemblance. Leaves petioled, petiole 2-3 mm., lamina oval or elliptical, almost concolorous, almost glabrous, not at all tomentose but with a few scattered stellate hairs, margin serrate or serrulate in upper half, veins and midrib prominent below, stellately hispid, base rounded, lamina ± 1·5 cm. long by 8 or 9 mm. broad. Peduncles 1-2 cm. long, stellately hispid. Stipules ± 2 mm. long. Calyx 6 mm. long, segments lanceolate, acuminate, sparsely hairy externally. Petals oblong-ovate, shorter than the sepals, ± 5 mm. long. Capsule hairy externally, strongly angled, hardly horned.

This plant is closely allied to *H. brachypetala* Harvey, which has velvety and canescent leaves.

I have compared authentic material of *Hermannia brachypetala* Harvey with that of *Mahernia tomentosa* Turcz., and, as far as I can judge, the two plants are synonymous. In Harvey & Sonder's *Flora Capensis* the former stands as no. 54 in *Hermannia*, and the latter as no. 33 in *Mahernia*. The following are probably varieties of this species, differing from type especially in the character of their leaves. *Bolus*, Herb. Austro-Africanæ, no. 1833, "In arenosis prope Hopetown," Dr. E. B. Muskett, differs from type in having much broader leaves; while in *Bolus* no. 5590, "In planitie prope Potchefstroom," legit *J. H. McLea*, the leaves are very discolorous.

H. damarana, sp. nov. Suffruticosa, novellis cano-subtomentosis, foliis breviter petiolatis oblongis vel oblongo-oblanceolatis vel oblongo-lanceolatis apice apiculatis basi angustatis trinerviis utrinque cano-subtomentosis margine integriusculis vel interdum apicem versus subserratis; stipulis subulatis petiolum subæquantibus; floribus axillaribus solitariis nutantibus vel subnutantibus, pedunculo pedicelloque cano-subtomentoso; bracteolis parvis linearibus; calyce turbinato in lacinias lanceolato-triangulares et subacuminatas ad medium diviso; petalis quam calyce longioribus vel subæquantibus anguste obovatis basi cuneatis; filamentis oblanceolatis antheris ciliolatis calycem subæquantibus; ovario extus subtomentoso haud cornuto, stylo usque ad medium pilosulo.

Hab. Dammaraland, *T. G. Een*, 1879.

Suffruticose, young branchlets herbaceous, cano-subtomentose. Leaves 1-1·7 cm. long, 3·5-4·5 mm. broad, cinereous-subtomentose on both surfaces, veins subprominent below. Petioles ± 3 mm. long. Flowers axillary, solitary. Peduncles shorter than the leaves, but much longer than the petiole. Calyx ± 7·5 mm. long, segments ± 4 mm. long. Petals narrowly obovate, generally slightly longer than the calyx, ± 8 mm. Anthers ciliolate, filaments oblanceolate. Style with lower half slightly hairy and a little longer than the anthers. Ovary hairy externally. Capsule not seen.

H. viscida Hiern, var. nov. Randii. Suffruticosa ramosissima glandulosa; petalis quam calyce brevioribus cuneato-oblanceolatis quam iis typi angustioribus.

Hab. Buluwayo, *Dr. R. Frank Rand*, no. 295.

Suffruticose, branching copiously, apparently a taller plant than type. Calyx ± 5·5 mm. shorter than in the type, segments lanceolate-acuminate, externally subpilose. Petals much narrower than in the type, ± 4·5 mm. long. Anthers longer than calyx, ciliolate. Capsule distinctly horned.

BRITISH BOTANY IN THE NINETEENTH CENTURY.

By W. A. Clarke, F.L.S.

The above title will, no doubt, be considered an ambitious one, and it seems desirable to explain that it is proposed merely to review, and that very briefly, the literature of the century affecting our native plants, and more especially the phanerogams. The chief cryptogamic works will also be referred to in order of date, but without any attempt at criticism—which, for the best of reasons, must be left to others.

Before proceeding to our task, it may be well to glance at the position of the British botanist at the end of the eighteenth century, and it will be found to have been by no means an unenviable one. Since the introduction of the Linnean system into the country, about the year 1760, much had been done by enthusiastic workers. We need only recall the names of Hudson, Withering, Lightfoot, Curtis, Sowerby, and Smith, in proof of this statement. Withering's *Botanical Arrangement* had gone through three editions, the last (1796) being, for the time, an excellent British Flora. Lightfoot's *Flora Scotica* (1777) had done much for the northern kingdom, of which previously little botanically had been known. Curtis's *Flora Londinensis* (1777–98) contained splendid life-sized coloured figures with accurate descriptions of nearly all the flowering plants to be found within twenty miles of London, and a few of the mosses and fungi. The work has retained its value to the present day.

James Sowerby had, in the same grand style, illustrated the British Fungi then known—about 400 species—and in 1790, together with Sir James Edward Smith, had commenced the well known *English Botany*. It appeared in monthly parts, each containing three plates—the first three being *Cypripedium Calceolus*, *Veronica spicata*, and *Erica vagans*, each dated "Nov. 1, 1790." The next part did not appear till Jan. 1, 1791, after which the work progressed with regularity. Up to the end of the century eleven volumes and part of the twelfth (altogether 822 plates) had been published. In 1788 the Linnean Society was established by

Sir James Smith and others, and five volumes of *Transactions* had been published. Stackhouse's *Nereis Britannica*, Velley's *Marine Plants of the Southern Coast of England*, and Bolton's *Illustrations of Ferns and Fungi* were valuable works for the student of cryptogams; and in the last year of the century the first two volumes of Smith's *Flora Britannica* were published. It will therefore be seen that at this period the British botanist was really very well supplied with descriptive works on the flora of his country.

For Ireland but little had been done—a few rare plants, such as *Dryas octopetala*, *Saxifraga umbrosa*, and *Arbutus Unedo*, had long been known as natives; and Caleb Threlkeld had in 1727 published a *Synopsis Stirpium Hibernicarum*, which, according to Pulteney, contained 535 species.

Smith's *Flora Britannica*, having been published in the last year of the century, affords some interesting statistics. The total number of flowering plants described is 1307, but this number may be reduced to 1180 by subtracting about 100 species not indigenous, and 27 Willows not now considered distinct species. This Flora also contains descriptions of 36 Ferns, 6 Equisetums, 6 Lycopodiums, 1 Pilularia, 1 Isoetes, 3 Charas, and nearly 300 Mosses. It does not include Algæ, Fungi, or Hepaticæ, but these families were included in Withering's *Botanical Arrangement*.

It may be also noted that the era of County Floras had commenced—Relhan, Sibthorp, and Abbot having published their Floras of the Counties of Cambridge (1785), Oxford (1794), and Bedford (1798), respectively. The continuation of these County Floras, which is one of the distinctive features of the botanical literature of the century, will be referred to later on,

We have seen that Smith & Sowerby's *English Botany* was commenced in 1790, but it extended through thirty-six volumes, till March, 1814, and so is the first work which demands our particular attention. Its merits are too well known to need any record here. Its 2592 plates comprise 1445 flowering plants (of which, however, only about 1250 are distinct native species), 40 Ferns, 7 Equisetums, 6 Lycopodiums, 1 Pilularia, 1 Isoetes, 6 Charas, 343 Mosses, 80 Hepaticæ, and 663 "Algæ" (including 280 Lichens).

The following, amongst other interesting plants, were first figured and described in this great work:—*Mathiola incana*, *Arabis ciliata*, *Draba azoides*, *Elatine hexandra*, *Oxytropis campestris*, *Rosa hibernica*, *Saxifraga Geum*, *Bupleurum aristatum*, *Aster Linosyris*, *Bryanthus taxifolius*, *Pyrola media*, *Moneses*, *Myosotis alpestris*, *Pinguicula grandiflora*, *Polygonatum verticillatum*, *Juncus tenuis*, *Scheuchzeria*, *Kobresia*, *Carex elongata*, *C. rariflora*, *C. humilis*, *C. tomentosa*, *C. vaginata*, *C. ustulata*, *Alopecurus alpinus*, and *Deyeuxia neglecta*.

Of course there were a large number of contributors to *English Botany* during the twenty-four years of its publication. A few of the more important were—the Rev. Charles Abbot, the Bedfordshire botanist; James Backhouse, of York; Rev. Henry Beeke, of Devonshire; Miss Biddulph (Algæ); William Borrer, of Henfield, Sussex, a large contributor; Rev. W. T. Bree, of Warwickshire; James Brodie, of Brodie, Elgin; W. Brunton, of Ripon; Rev. H. Bryant, Norfolk; James Crowe, Norfolk, a student of Willows; Rev. Sir J. Cullum & Sir T. G. Cullum, Suffolk botanists; Rev. James Dalton, Rector of Croft, Yorkshire, the discoverer of *Scheuchzeria*; Rev. Hugh Davies, of Anglesea, author of *Welsh Botanology*; George Don, the Superintendent of the Edinburgh Botanic Garden, a large contributor of Highland plants, but including a considerable number which have not since been found, and so seem to have been erroneously recorded as natives; F. K. Eagle, Suffolk; Rev. R. Forby, Rector of Fincham, Norfolk; Edward Forster, Essex; Sir Thomas Gage (Lichens); R. K. Greville (Algæ); Miss Griffiths, of Torquay (Algæ); Rev. J. Harriman, Yorkshire; Rev. J. Hemsted, many plants from Cambridgeshire; Miss Hutchins, of Bantry (Algæ and Mosses); A. B. Lambert, of Boyton, Wilts; Rev. G. R. Leathes, Norfolk; Charles Lyell (Lichens); James T. Mackay and John Mackay, large contributors of Irish and Scotch plants respectively; W. Mathew, of Bury St. Edmunds; John Pitchford, of Norwich, the discoverer of *Holosteum umbellatum*; Jacob Rayer, Kentish plants; Rev. R. Relhan, of Cambs.; Edward Robson, of Darlington, many plants; Jonathan Salt, of Sheffield; Rev. Charles Sutton, Norwich; John Templeton, of Belfast, discoverer of *Rosa hibernica*; and Lilly Wigg, of Yarmouth.

During the progress of *English Botany* several works appeared, which may here be briefly noticed. In 1804, Walter Wade, of Dublin, published his *Plantæ rariores in Hibernia inventæ*, which must have been very welcome, as very little had hitherto been done for Ireland; and the next year (1805) Turner and Dillwyn's *Botanist's Guide through England and Wales* appeared, consisting simply of county lists of localities for our rarer plants. In 1807 a great work was completed by Prof. Thomas Martyn, of Cambridge —namely, a new edition of Miller's *Gardener's Dictionary*. About the same time the British "Fuci" were dealt with by Dawson Turner—first in a Synopsis (1802), and afterwards in a more complete work of four volumes (1808-1819). In 1802 Dillwyn commenced his valuable monograph on the British "Confervæ," illustrated by 116 coloured plates; and in 1816 a monograph on British *Jungermanniæ* was published by William Jackson Hooker. He also about the same time reissued Curtis's *Flora Londinensis*, with large additions; and in 1818, with Thomas Taylor, produced an excellent work on British Mosses. The above-named are the chief works on British botany which appeared during the first twenty years of the century. The Linnean system under the auspices of Sir James Smith held undisputed sway in England; but the elder Hooker, above mentioned, who was then the rising botanist, in the early part of 1821 published his *Flora Scotica*, "arranged both according to the artificial and natural methods." In the preface, dated 10 April, 1821, the author claims the merit of being the first to arrange indigenous plants according to the natural system. This work being in the main a compilation from Lightfoot's *Flora Scotica* and *English Botany*, need not detain us long. The additional localities were mostly derived from Hopkirk's *Flora Glottiana* (1813), and notes supplied by Robert Maughan, R. K. Greville. and others. In the Fungi, Persoon's *Synopsis* is followed, and Sowerby's figures are quoted. *Myosotis repens* and *Hierochloe borealis* are here first recorded as natives.

Later in the same year (1821) a very interesting work appeared —namely, Gray's *Natural Arrangement of British Plants*, "according to their relations to each other as pointed out by Jussieu, De Candolle, Brown, &c., including those cultivated for use, with an Introduction to Botany, in which the terms newly introduced are explained; illustrated by figures." This work, though nominally by Samuel Frederick Gray, was mainly written by his son, John Edward Gray. It contains twenty-one good plates, dated "Nov. 1st, 1821." In the preface, Gray gives as a reason for not quoting the plates of *English Botany* the very high price of the work—generally not less than fifty guineas; he therefore quotes Gerard and Parkinson. The introduction contains a short history of the progress of botany, and a list of works from 1468 to 1821.

One remarkable feature in this work is the nomenclature, for the author has, in a large number of instances, rejected the names of Linnæus, especially his specific names, and given new ones of his own invention. He always does this where the Linnean specific name is a substantive—thus, *Achillea Ptarmica* becomes *A. sylvestris; Acorus Calamus, A. undulatus; Alisma Plantago, A. major;* and so on. As a "Flora" of the country in the modern sense, this work could be of very little use, as Gray gives hardly any localities, even for the rarer species.

The year 1823 saw the commencement of R. K. Greville's *Scottish Cryptogamic Flora*, followed next year by his *Flora Edinensis*. And now we have a very important work to review. Sir J. E. Smith, who had done so much for British Botany, crowned his efforts by his excellent *English Flora*, the first two volumes of which appeared in 1824. The first volume is dedicated to Sir Thomas Gery Cullum, and in a long and interesting preface Smith reviews the chief works on British Botany, commencing with How's *Phytologia Britannica* (1650). Adverting to his share in the production of *English Botany*, he says: "My name at first did not appear; but, finding the book a fit vehicle for original information and criticism, I publicly acknowledged it by a preface to the fourth volume in 1795, and the title-page of every succeeding volume declares its real author"; but, notwithstanding this, he complains of "the flippancy with which everybody quotes 'Sowerby,' whom they know merely as the delineator of the plates, without adverting to the information of the work or the name of its author." As to his *Flora Britannica*, he says: "The chief merit to which this work aspires is originality. The author has examined everything for himself, copying nothing without investigation." In this preface and in the entire work Smith most improperly ignores Gray's *Natural Arrangement*, even having the hardihood to say, "I have for the first time in a general British Flora introduced the Natural Orders of our plants"! Smith's work, however, was arranged by the Linnean system, and merely contains the briefest references to the natural orders of Jussieu. Nevertheless the work was an excellent Flora of the country; the third volume was published in 1825, and a fourth in 1828. The Cryptogams, except Ferns, are not included. It was the last work of the author, who died 17th March, 1828.

In 1829 the Rev. J. S. Henslow, Professor of Botany at Cambridge, published a *Catalogue of British Plants* "arranged according to the Natural System, with the synonyms of De Candolle, Smith, and Lindley." It comprises fourteen hundred and fifty indigenous and fifty-one naturalized plants. This Catalogue is very interesting, being, as far as I know, the earliest of its kind, and a sort of precursor of the well-known *London Catalogue.* In the same year John Lindley, Professor of Botany in University College, London, published *A Synopsis of the British Flora* "arranged according to the natural orders." This was a small book, the descriptions of the orders, genera, and species being concise, and localities mentioned few. In his preface, alluding to the long reign of the Linnean system under Smith and his followers, he says: "That the system of classification invented by Linnæus was altogether worthy of the reputation of that great man, considering the state of science at the time when he lived, and that it effected much temporary good, may perhaps be conceded; but that any botanist should attempt to deny that when it fell into the hands of such men as were esteemed the heads of the Linnæan system during the last quarter of a century it became a positive incubus upon science, is to me, I must confess, a subject of unfeigned astonishment. Surely it cannot be denied that this school has acted as if the whole object of Botany were naming and describing species, evidently mistaking the means for the end, and converting the study of the vegetable kingdom into a system of verbal trifling." This little book contained the first notice of *Erica ciliaris*, which had been lately found by Rev. J. S. Tozer near Truro; also several new species of *Rubus.* A second edition appeared in 1835.

In 1830 Lindley published his *Introduction to the Natural System*, and in the same year Sir W. J. Hooker catered for the British botanist with his *British Flora*, which subsequently went through many editions. Hooker returned to the Linnean system in this handbook, which, steering a middle course between the voluminous *English Flora* of Smith and the too concise one of Lindley, was a very meritorious work. A second edition appeared in 1831, a third in 1835, a fourth in 1838, and others later. The account of the Roses is very full and complete, embodying Joseph Woods's valuable paper in vol. xii. of the Linnean *Transactions.*

In 1831 the first volume of a Supplement to *English Botany* appeared, the descriptive part being chiefly by Hooker & W. Borrer. The first part was issued in August, 1829. Three more volumes appeared in 1834, 1843, and 1849, and part of a fifth volume in 1865; these together form a very valuable addition to the original work, containing as they do a large number of excellent figures and descriptions of British plants, mostly discovered since 1814, with a few others not figured in *English Botany*. It includes Cryptogams. In 1830 R. K. Greville published his *Algæ Britannicæ*, with nineteen coloured plates; and in 1831 Lindley & Hutton's *Fossil Flora of Great Britain* was commenced.

A little anonymous work appeared in 1833 under the title of *The Irish Flora, comprising the Phænogamous Plants and Ferns.* It is understood to have been written by Katherine Baily, afterwards Lady Kane. It is arranged by the Linnean system, and most of the habitats were contributed by John White, of the Glasnevin Botanic Garden. It was reprinted in 1846.

The next important work requiring notice is the *British Phænogamous Botany* of William Baxter, 6 vols., 1834–1842. It contains about five hundred good coloured plates, only one plant in each genus being represented; the descriptions are very carefully drawn up, and for the rarer species lists of localities arranged under counties are added; the synonyms and references to previous works are carefully worked up.

As County Floras were still few and far between, the *New Botanist's Guide*, 2 vols., 1835–7, consisting of county lists of the rarer British plants, must have been very welcome. Its author, the late Hewett Cottrell Watson, was an indefatigable worker on the distribution of the British Flora for more than forty years—from 1832 to 1874. We shall hear of him again.

In 1836 a noteworthy advance was made by the foundation—by Robert Graham, R. K. Greville, J. H. Balfour, and others—of the Botanical Society of Edinburgh, and in the same year this Society published a *Catalogue of British Plants*, containing sixteen hundred and thirty-six species, including fifty-eight cryptogams. The Botanical Society of London was founded in July of the same year, John Edward Gray being the first President. In the same year James Townsend Mackay did good work for Ireland by the production of his *Flora Hibernica*. He had published a *Catalogue of Irish Plants* in 1825, but his Flora was for many years the standard work on the subject.

Mr. G. W. Francis's *Analysis of the British Ferns and their Allies* (1837) went through several editions. The *Annals and Magazine of Natural History*, conducted by Sir W. Jardine, P. J. Selby, Sir W. J. Hooker, and others, commenced in 1838, following Loudon's *Magazine of Natural History* (1829, &c.). At this period one whose long life was devoted to British Botany was coming into prominence—namely, Charles Cardale Babington. His earliest work was a little *Flora of Bath and its Neighbourhood*, 1834 (with a Supplement in 1839); and in the latter year he published his *Primitiæ Floræ Sarnicæ, or an Outline of the Flora of the Channel Islands.*

In 1840 a *History of British Ferns* was published by Edward Newman, which went through several editions. In 1841 the native Seaweeds were described by W. H. Harvey in his *British Marine Algæ;* a second edition appeared in 1849, illustrated by a series of dried specimens. In the year 1841 also a very useful magazine was started, entitled *The Phytologist*. In its old and new series it extends from 1841 to 1863, when it was discontinued, but immediately followed by the *Journal of Botany*, which happily is still flourishing. The articles in the *Phytologist* were mostly concerned with British Botany, and by means of this magazine and its successor we have a very complete history of the progress of the science in the British Isles during the last sixty years of the century. Some of the chief contributors to the early volumes of the *Phytologist* were Dr. Bromfield, Edwin Lees, Edward Newman, H. C. Watson, Thomas Moore, E. G. Varenne, James Backhouse, Rev. W. T. Bree, Jos. Woods, G. S. Gibson, and William Wilson of Warrington. In 1842 a very attractive book on *British Forest Trees, indigenous and introduced*, was published by P. J. Selby. It is an octavo volume of 540 pages, illustrated by a large number of delightful engravings. It is a choice and, I believe, now rather scarce work.

We now come to the year 1843, in which a work appeared which forms an epoch in the history of British Botany—namely, the famous *Manual* of the late Professor Babington, the first edition of which was published on 1st May of this year. A few extracts from the preface to this volume (which differs in later editions) will be read with interest. The author remarks that, from the attention which had long been paid to the elucidation of the flora of Britain, he "did not suppose that much remained to be done in British Botany, for he could not expect that, after the labours of such men as Smith, Hooker, Lindley, and others, and the publication of so invaluable and unrivalled a collection of figures as is contained in the *English Botany*, there could still be many questions concerning the nomenclature or any considerable number of unascertained species the determination of which would fall to his lot. He had not, however, advanced far in the critical examination of our native plants before he found that a careful comparison of indigenous specimens with the works of eminent continental authors and with plants obtained from other parts of Europe must necessarily be made, for it appeared that in very many cases the nomenclature employed in England was different from that used in other countries; that often plants considered as varieties here were held to be distinct species abroad; that several of our species were only looked upon as varieties by them; and also that the mode of grouping into genera was frequently essentially different." He then expresses his surprise at these discoveries, and attributes the facts to the ascendency of Sir J. E. Smith, "the fortunate possessor of the herbarium of Linnæus," and to the long separation of this country from continental nations, owing to the war with Napoleon, "by which we were almost completely prevented from observing the progress which botanical science was making in other countries," so that "at the conclusion of the war we had become so wedded to the system of Linnæus and . . . . so well satisfied with our own proficiency that, with the honourable exception of Mr. Brown,* there was at that time scarcely a botanist in Britain who took any interest or paid the least attention to the classification by natural orders which had been adopted in France, and to the more minute and accurate examination of plants which was caused by the employment of that philosophical arrangement." As to the plan of *Manual*, he says: "Synonyms have been almost wholly omitted, but at least one British and one German figure of each plant is quoted in all cases in which it could be done with accuracy. Localities are only given for new or peculiarly rare plants, the existence of so complete a work as Mr. Watson's *New Botanist's Guide* having made it unnecessary inconveniently to swell the present volume by their introduction." He acknowledges his obligations "to his friends Professor Balfour, of Glasgow, and D. Moore, Esq., of the Glasnevin Botanical Garden at Dublin, for complete Catalogues of the Floras of Scotland and Ireland respectively," and to W. Borrer, Prof. Henslow, E. Forster, the Rev. W. A. Leighton, and others. It will be seen that a guide to the British Flora was here promised far superior to anything hitherto published in England, and the promise was amply fulfilled. Babington had already commenced the careful study of *Rubi*, and the *Manual* contained descriptions of twenty-four species and numerous varieties. This *Manual* was a great success, and went through many editions, all carefully brought up to date by the author; the second appeared in 1847, the third in 1851, the fourth in 1856, and the 8th and last in 1881. The book is too well known to require further description.

---

* Robert Brown, who adopted the Natural System as early as 1810 in his *Prodromus Floræ Novæ Hollandiæ*.

The well-known *London Catalogue of British Plants*, published by the Botanical Society of London, already mentioned, first appeared in 1844, and has now gone through nine editions. The total number of species contained in the first was fourteen hundred and twenty-eight, of which thirteen hundred and seventy-one are phanerogams. The nomenclature adopted was that of Hooker's *British Flora*, which had then gone through five editions in less than a dozen years. The Rev. J. E. Leefe was then the chief authority in the genus *Salix*, and Mr. Edwin Lees was consulted as to *Rubi*.

In 1845 the British freshwater Algæ were described and illustrated in two handsome volumes by A. H. Hassall, and in the next year Babington published his *Synopsis of the British Rubi*. Also in this year Harvey's *Phycologia Britannica* appeared, forming an important addition to our knowledge of marine Algæ. It is illustrated by 360 fine coloured plates, and describes 388 species. Henfrey's *Outlines of Structural and Physiological Botany* (1847) was a very useful work, by a master of his subject. In this year also Hewett Cottrell Watson commenced the publication of his valuable *Cybele Britannica*, an elaborate work showing the distribution of each of our native flowering plants through eighteen provinces, afterwards subdivided into one hundred and twelve vice-counties. Each species is also classified as a native, colonist, denizen, or alien; and, again, as British, English, Atlantic, Germanic, Scotch, or Highland. A second volume of the *Cybele* appeared in 1849, a third in 1852, and a fourth in 1859. Mrs. Hussey's *Illustrations of British Mycology*, also published in 1847, was an interesting addition to the library of the cryptogamic botanist. About this time we first hear of the American water-weed *Elodea* in England, the second and third volumes of the *Phytologist* containing several notices of its occurrence.

In 1849 the botanical student must have welcomed J. H. Balfour's *Manual of Botany*, and the still more valuable translation by Edwin Lankester of Schleiden's *Principles of Scientific Botany.* The *Botanical Gazette*, a monthly journal edited by A. Henfrey and others, was commenced in 1849, and continued to 1851. It contains many interesting papers by C. C. Babington, H. C. Watson, Rev. W. A. Leighton, and other well-known botanists. An early number in 1850 contained an abstract of Fries's *Symbolæ ad Historiam Hieraciorum*, which must have opened the eyes of many of its readers. About this time this genus (*Hieracium*) was beginning to be seriously studied by Messrs. James Backhouse, J. G. Baker, and others, and many additions were made to the British list of species. (See Phytol. iii. 996 and iv. 805, 844.)

The events of 1852 were the appearance of J. H. Balfour's excellent *Class Book of Botany*, entirely superseding former works of the like character, and Henfrey's translation of Von Mohl on the vegetable cell. Passing on to 1855, we have in Wilson's *Bryologia Britannica* a valuable addition to the literature of mosses; and next year James Backhouse published his well-known *Monograph of the British Hieracia*, in which he described thirty-three species as British, many of them only then recently distinguished.

In 1857 the Rev. M. J. Berkeley published his *Introduction to Cryptogamic Botany*, and in the same year appeared Henfrey's *Elementary Course of Botany*; and this brings us to 1858, when a most useful book was published, namely, the excellent *Handbook of the British Flora . . . for the use of Beginners and Amateurs*, by George Bentham. The author of this delightful book had already distinguished himself by his *Monograph on the Genera and Species of the Labiatæ* (1832–6), and subsequently obtained a world-wide reputation by the great *Genera Plantarum*, produced by him in conjunction with Sir J. D. Hooker, 1862–83. In the preface to this *Handbook* the author, after saying that he "had been frequently applied to to recommend a work which should enable persons having no previous knowledge of botany to name the wild flowers they might gather in their country rambles, and that he had found this difficult, as the standard floras required too much previous scientific knowledge for a beginner or mere amateur," goes on to say that he "here attempted a descriptive enumeration of all the plants wild in the British Isles distinguished by such characters as might be readily perceived by the unlearned eye, and expressed in ordinary language, using such technical terms only as appeared indispensable for accuracy, and whose adopted meaning could be explained in the work itself." This being his object, he at first thought that a mere compilation might be sufficient, "the British plants being so well-known, and having been so repeatedly described with so much detail; but he soon found that a careful comparison and verification of the characters upon the plants themselves was necessary." He then states that the descriptions had been drawn up from British specimens, and compared with the characters given in Hooker & Arnott's *British Flora* and Babington's *Manual*, or with detailed descriptions in some of the best local floras; that they had been verified upon continental specimens, and checked by the examination of living specimens; and that he had "availed himself of numerous and repeated observations made during forty years' herborizations in various parts of Europe." The result of his labours certainly was the production of a most attractive introduction to the study of the British Flora, freed from every unnecessary difficulty. As to his method of treatment of species, he says:—"It will no doubt be matter of astonishment that whilst the last edition of Hooker & Arnott's *Flora* (1855) contains 1571 species, and that of Babington's *Manual* (1856) as many as 1708 (exclusive of *Chara*), that number is in the present work reduced to 1285. This is not owing to any real difference of opinion as to the richness and diversity of our vegetable productions, but is occasioned by a different appreciation of the value of the species themselves." Accordingly he greatly reduces the number of brambles, roses, hawkweeds, and willows which had been separately described by Babington and others, and also lumps together many species in the other genera—*e. g.* the Batrachian *Ranunculi*, which he includes under the single name *R. aquatilis*. Such treatment of closely allied species is, no doubt, eminently desirable in a book meant for the beginner.

In reviewing this *Handbook* a word of praise must be added for its excellent analytical keys to the natural orders, and also to each important genus. The plates of *English Botany* are referred to throughout. Bentham's *Handbook*, together with a few good life-sized outline drawings of about one hundred of the plants most likely to be met with by a beginner (which latter is, in my opinion, still a desideratum in the literature of British botany), would be worth their weight in gold to anyone wanting an inducement to take up some branch of natural science. Such plates would make the first identifications easy, and afterwards the *Handbook* alone would be sufficient. There is also an illustrated edition of this *Handbook*, but the figures are very small.

In 1863 was commenced a very important work, being a new edition of Smith & Sowerby's *English Botany*, with entirely fresh descriptions of the genera and species by J. T. Boswell Syme. The plates are reproductions of those in the original, with new ones for species since discovered, and the colouring of them by hand is very inferior; Syme's descriptions, however, are valuable. Here again the work is too well-known to require a detailed description. In the same year was commenced the *Journal of Botany, British and Foreign*, under the editorship of Berthold Seemann, and it has continued under different editors to the present time.

During the latter part of the century the works in some way connected with British botany have been so numerous that I can only select a few for notice.

Daniel Oliver's *Lessons in Elementary Botany* (1864) is a useful book for a beginner; and in 1866 Messrs. D. Moore and A. G. More commenced to publish their *Cybele Hibernica, or Outlines of the*

Geographical Distribution of Plants in Ireland. In 1869, Professor Babington published an able account of the British *Rubi*, with very full descriptions of the numerous species into which the genus had then been divided. This brings us to the year 1870, when yet another guide to "the British Flora" appeared, and has received a considerable amount of patronage, for this is the date of the first edition of *The Student's Flora of the British Islands*, by Sir J. D. Hooker; the object of which, in the words of the author, was "to supply students and field botanists with a fuller account of the flowering plants and vascular cryptogams of the British Islands than the manuals hitherto in use aim at giving." We are told by the author that "the ordinal generic and specific characters were to a great extent original, but collated with those of Mr. Boswell-Syme in his edition of *English Botany*." The book has many good and useful features which distinguish it from other similar works; the distribution of each species throughout the world is shortly stated; also the total number of species in each genus. In the critical genera—*Rubus*, *Rosa*, and *Hieracium*—a plan of grouping allied species or varieties is adopted which is intermediate between those of Babington and Bentham. A third edition of this handbook appeared in 1884, containing improvements in the classification and characters of the orders, genera, and tribes in accordance with the before-mentioned *Genera Plantarum* of the author and George Bentham; and since this date no new British Flora has appeared. Such a work brought up to date is now much wanted.

For the student of cryptogams two important works appeared in 1871—M. C. Cooke's *Handbook of British Fungi*, and Rev. W. A. Leighton's *Lichen Flora of Great Britain, Ireland, and the Channel Islands*. This latter, a most elaborate work, went through three editions, the last in 1879.

In 1873-4 the two volumes of H. C. Watson's valuable *Topographical Botany* appeared; and a second edition, corrected and enlarged by J. G. Baker and Rev. W. W. Newbould in 1883. This well-known work affording a bird's-eye view of the distribution of the several species of the British Flora, is indispensable to the field botanist. It is to be hoped that a new edition, for which much material has been accumulated, may soon be published.

In 1878 a very interesting *Dictionary of English Plant Names* was commenced by Messrs. James Britten and Robert Holland. In a review of the first part it was truly stated that "such an extensive series of the names of English plants has never before been seen." The *Dictionary* was completed in 1886. Readers of this Journal will also gratefully remember the very useful *Biogrbphical Index of British and Irish Botanists* compiled by Messrs. James Britten and G. S. Boulger, 1888-91.* In 1880 Dr. Braithwaite commenced to publish a most complete work on the *British Moss-Flora*, with accurate illustrations of every species. This is now near its completion, and, for those to whom its expense is a barrier, an excellent Manual on the same subject was published in 1896 by Messrs. H. N. Dixon and H. G. Jameson. From these works it appears that the number of species known as British has quite doubled during the century. Valuable works on British Fungi have during recent years been produced by Mr. M. C. Cooke, adding a very large number of species to the British list. In 1892 a Supplement to the third (Syme's) edition of *English Botany* was commenced, and is still in progress. The Irish Flora has also received much attention, and its distribution has been worked out in the before-mentioned *Cybele* of Messrs. D. Moore and A. G. More (ed. 1, 1866; ed. 2, 1899), and in several local Floras. But perhaps some of the best work of the last fifty years has been done by experts on certain critical genera, especially the elucidation of the Pondweeds by Messrs. Arthur Bennett and Alfred Fryer; the Roses and Rubi by Professor Babington, Rev. W. M. Rogers, and others; the Hawkweeds by Messrs. Hanbury, Linton, and Marshall; and the *Characeæ* by Messrs. H. & J. Groves.

---

* [Mr. Clarke's modesty forbids him to refer to his interesting *First Records of British Flowering Plants*, which was first issued in this Journal and appeared last year in a second (revised and corrected) edition; but it cannot be omitted from this enumeration.—Ed. Journ. Bot.]

The latter part of the century was marked by the appearance of translations of some of the best German works on Botany, including Sachs' *Text-book*, first translated by Messrs. Bennett and Dyer (1875), and later by Professor Vines. On a former page reference has been made to the three County Floras produced in the eighteenth century. The last century, especially the latter half of it, has been productive of a large addition to these, so that now but few counties are without a Flora. One of the earliest was Baines's *Flora of Yorkshire* (1840), followed next year by an excellent one for Shropshire by the Rev. W. A. Leighton, excellent at least for its careful and complete descriptions of species; the localities enumerated are but few. A *Flora of Herts* appeared in 1849, and that of Wilts was commenced by the late Thomas Bruges Flower in 1857 (a more complete one by Rev. T. A. Preston being published in 1888). These were the chief Floras appearing in the first half of the century. During the latter half the following counties have been treated in like manner. I mention them in order of date:—Cambs, Essex, Surrey, Norfolk, Devon and Cornwall, Worcester, Middlesex, Dorset, Hants, Oxon, Herts, Suffolk, Derby, Warwick, Somerset, Berks, Kent, Cheshire, and Cumberland; also some Scotch and Irish Floras have appeared, and one for Carnarvonshire and Anglesea. The early Floras were imperfect in many ways, but a marked improvement commenced with that of Middlesex (1869), in which the county was divided into districts according to the river drainage, and all old records were carefully looked up.

Another important matter dealt with during the last twenty years of the century is nomenclature, and our British list has suffered many changes from an endeavour to adhere strictly to the "law of priority." I have already mentioned the chief new plants which were figured and described in *English Botany* (1790–1814). Since that date the most interesting additions to the British flora during the century were the following:—*Elatine Hydropiper*, *Hypericum* *linariifolium* and *H. undulatum*, *Ulex Gallii*, *Trifolium Bocconi*, *T. strictum*, and *T. Molinerii* (all three found in Cornwall between 1840 and 1850), *Astragalus alpinus*, *Cotoneaster*, several species of *Callitriche*. *Epilobium lanceolatum*, *Bupleurum falcatum*, *Œnanthe pimpinelloides*, *Selinum Carvifolia*, *Inula salicina* (found in Ireland in 1843, but not published till 1865), several species of *Arctium*, *Phyteuma spicatum*, *Erica ciliaris* (found in Cornwall), and two other species found in Ireland, the true *Primula elatior* (1841) and *P. scotica*, some subspecies of *Myosotis*, several species of *Orobanche* and *Utricularia*, *Pinguicula alpina*, *Thymus Chamædrys*, *Calamintha sylvatica*, *Stachys alpina*, *Teucrium Botrys*, *Herniaria hirsuta*, *Polygonum maritimum* and *P. mite*, *Euphorbia stricta* and *E. pilosa*, *Salix lanata*, *Elodea canadensis*, *Spiranthes æstivalis* in Hants and *S. Romanzoffiana* in Ireland, *Epipogum aphyllum*, two species of *Epipactis*, *Ophrys arachnites* in Kent, *Habenaria intacta* in Ireland (1864), *Romulea Columnæ*, *Sisyrinchium angustifolium* (Ireland), *Gladiolus illyricus* (Hants), *Leucojum vernum*, *Simethis bicolor*, several species of *Allium*, *Juncus*, and *Luzula*, *Wolffia Michelii* (our smallest flowering plant), numerous species of *Potamogeton*, *Cyperus fuscus*, *Scirpus nanus* and *S. cernuus*, *Eriophorum gracile*, about fifteen species of *Carex*, and a like number of Grasses. The last edition of the *London Catalogue* (1895) contains 1861 separately numbered species of flowering plants, 48 Ferns, 11 Equisetums, 5 Lycopodiums, and 33 other species (*Isoetes*, *Pilularia*, *Chara*, *Nitella*, &c.); but, if we deduct from the above 16 Channel Island species, 192 not indigenous, and about 150! Rubi and Hieracia, it would reduce the number of flowering plants to about 1500, which may be compared with the 1180 with which the century started.

NOTES ON AFRICAN LABIATÆ.

By James Britten, F.L.S.

In the course of arranging the African Labiatæ in the National Herbarium in relation to the monograph of the order in the recently published parts of the *Flora of Tropical Africa*, I have jotted down a few notes which may be taken as supplementary to Mr. Hiern's notice of the work on pp. 108–111. I have printed only those which may be of use to other workers in the same field, and therefore have not cited such additional numbers or localities as are found in our Herbarium. Many of the notes relate to the Welwitsch collection, of which, as is well known, the British Museum possesses what is practically the study set. It is not quite easy to see on what principle numbers are quoted: for some common species—e. g. *Leucas martinicensis*, "a cosmopolitan tropical weed"—the citations are very numerous; in other cases specimens intimately connected with the establishment of the species are not referred to: the numbers of Schimper, Hildebrandt, Welwitsch, and Scott Elliot are among those incompletely quoted. A few synonyms omitted from the Flora may be added to those given by Mr. Hiern (*l. c.* 109, 110); *Leucas ciliata β hirsuta* is the name under which Kotschy's plant, the type of Bentham's *L. nubica*, was distributed; it is cited by Bentham (DC. Prodr. xii. 530) as "*L. ciliata* Hochst. non Benth." The names (only) in Brown's appendix to Salt's *Abyssinia* have of course no claim to recognition; but, as *Moluccella integrifolia* is quoted, it is not easy to see why *M. scariosa* and *M. repanda*, which stand upon precisely the same footing, are omitted. *Acrocephalus villosus* Thoms. (non Benth.) in Appendix to Speke's Journal, 644, might have been quoted under *A. cylindraceus.*

In the genus *Ocimum*, the correlation (in the appendix) of the Welwitsch plants taken up in the Flora with those of Mr. Hiern's Catalogue is imperfect. For example, Welwitsch 5571, which Mr. Baker makes the type of a new species, is placed by Mr. Hiern without doubt under *O. americanum* Mill. (*O. canum* Sims); No. 5583, which according to Mr. Hiern is partly *O. americanum* and partly *O. knyanum*, is placed by Mr. Baker under the former; No. 5568, similarly divided by Mr. Hiern, is not cited in the Flora; No. 5572, according to Mr. Hiern is *O. suave*, according to Mr. Baker, *O. viride.* Under *O. Johnstonii*, *O. graveolens* Oliv. in Trans. Linn. Soc. series 2, ii. 347 (not of A. Br.) should have been cited.

In the genus *Æolanthus*, the Welwitsch correlation is again imperfectly done. For example, Mr. Hiern refers three Welwitsch numbers to *Æ. Welwitschii* Briq., and the plants they represent are manifestly identical. In the *Flora*, however, one of the three is taken as the type of a new species, *Æ. cuneifolius* Baker (which is placed in a section to which it cannot possibly belong), and no reference is made to Mr. Hiern's determination. In the same way, the two numbers identified by Mr. Hiern as *Æ. Engleri* Briq. are considered in the Flora as two species, one of them new; and no allusion is made to the identification in the Welwitsch Catalogue. There are indeed many evidences that the comparison of the two books has been done in a perfunctory manner: e. g. on p. 459 it is stated that *Salvia pseudococcinea* "was found by Welwitsch in Angola," whereas Mr. Hiern rightly records it for the island of Madeira.

Plectranthus cylindraceus Hochst. In the Welwitsch Catalogue (i. 861) Mr. Hiern unites with this species, which he places under *Germanea* (an earlier name for the genus), *Geniosporum lasiostachyum* of Briquet (in Engl. Bot. Jahrb. xix. 164)—a species established on the Welwitsch number (5489) which Mr. Hiern places under *P. cylindraceus.* In the *Flora of Tropical Africa* (v. 351) Mr. Baker retains *Geniosporum lasiostachyum*, citing Welwitsch 5489, but adds a note that "Welwitsch's 5489 is represented at Kew by a *Plectranthus*," Later on in the same monograph (p. 414) Mr. Baker establishes a new species, *P. moschosmoides*, upon Welwitsch 5489. In the National Herbarium we have besides Welwitsch's specimens the type of Hochstetter's *cylindraceus;* and there can be no doubt as to these being identical. Mr. Baker, in his key to the species, characterizes *P. moschosmoides* as having entire leaves, those of *P. cylindraceus* being crenate; but the leaves in Welwitsch's plant correspond exactly in their margins with those of *P. cylindraceus*. In the copious "addenda" to the *Flora* no reference is made to the identity of *G. lasiostachyum* with *P. cylindraceus*, although this is clearly indicated by Mr. Hiern.

The synonymy of the plant under *Plectranthus* is:

Plectranthus cylindraceus Hochst. in Schimp. iter Abyss. Sect. 2, 1113! Benth. in DC. Prodr. xii. 60 (1848); Baker in Fl. Trop. Afr. v. 414 (Dec. 1900). *Germanea cylindracea* Hiern, Welw. Cat. i. 861 (Aug. 1900).

Geniosporum lasiostachyum Briquet in Engl. Bot. Jahrb. xix. 164 (1894); Baker in Fl. Trop. Afr. v. 351 (June, 1900).

Plectranthus moschosmoides Baker in Fl. Trop. Afr. v. 414 (Dec. 1900).

The omission under *Solenostemon ocymoides* of the synonym *Coleus? africanus* (Benth. herb. 54) is not of much importance, but it might have been cited, especially as Don's specimens, on which Bentham's plant was established, are in the National Herbarium. *Coleus orbicularis* Baker (*l. c.* p. 437) is, as noted by Mr. Hiern (Journ. Bot. 1901, 108) the same as *Solenostemon niveus* Hiern, Welw. Cat. i. 864, the full description of which is transcribed on p. 526 of the *Flora*, without any indication that the plant had already been described from the same Welwitsch number earlier in in the book. "*Coleus rupestris* Hochst. in Schimp. Pl. Abyss. No. 2172" is cited (p. 409) as the type of *Plectranthus rupestris* Baker, and later (p. 430) as a synonym of *C. barbatus* Benth. var. *Schimperi* Baker (*C. Schimperi* Vatke). According to Briquet (Bull. Herb. Boiss. ii. 131) the two plants are identical. This author retains the name *C. rupestris* Hochst., and says: "Le nom donné par Hochstetter ayant été publié dans un exsiccata régulièrement numéroté, à étiquettes autographiées, a une priorité incontestable sur celui de Vatke, au terme des Lois de la Nomenclature, art. 42." This position seems, as M. Briquet says, "incontestable," but it is not accepted by Mr. Jackson, in whose *Index* Hochstetter's names are ignored. Nor does Mr. Baker always cite them: *e.g.* I cannot find in the African Flora *Acrocephalus abyssinicus* Hochst. in Schimp. Pl. Abyss. ed. ii. no. 2046. There is also an unnecessary variety in the citation of the plants; in many cases the names are quoted thus: "*Thymus serrulatus* Hochst.; Benth. in DC. Prod. xii. 203"; in others thus: *Micromeria longiflora* Hochst. in Schimp. Pl. Abyss. Exsicc. no. 2192": the latter is manifestly the correct method. If, however, the principle be acted upon, it will result in changes of accepted names: Mr. Baker, for example, retains *Salvia Schimperi* Benth. in DC. Prod. xii. 282 [1848], and cites (as does Bentham) *S. hypoleuca* Hochst. in Schimp. Pl Abyss. exsicc. [sect. 3] no. 1916 [1844]. Bentham seems to have set this aside in favour of his own *S. hypoleuca* (Prodr. xii. 279), but if the Schimper label constitutes publication Hochstetter's name must be restored, and *S. hypoleuca* Benth. will require another trivial designation.

J. G. AGARDH

(1813–1901).

Jacob Georg Agardh, who died on January 17th last, was born at Lund on December 8, 1813. He was the son of Dr. Carl Adolf Agardh, who was at one time a professor at Lund University, and afterwards became bishop in the diocese of Karlstad. Both father and son devoted their botanical energy to the study of marine algæ, the elder Agardh laying the foundation and the son continuing the work till within a few months of his death. Jacob Agardh studied at the University of Lund, which he entered as a student in 1826: in 1832 he became doctor of philosophy, docent in 1834, and demonstrator of botany in 1836. In 1847 he became extraordinary professor, and in 1854 he was made ordinary professor, which post he held till 1879, when he retired.

The first few papers he published were on botanical subjects other than marine algæ; but in 1836 appeared his first paper in the branch of botany of which he was to become so great a master. From that year till shortly before his death he continued to write on marine algæ, and leaves behind him a monument of labour and learning. His greatest work is the *Species Genera et Ordines Algarum*, of which the first volume was published in 1848, and dealt with the group of *Phæophyceæ*. Four volumes on *Florideæ* followed, the last being a revision and enlargement of the first two. The *Corallineæ*, published in the second volume, were treated by Prof. Areschoug, and were not revised by Prof. Agardh in his later work; indeed, that group was never worked out by him, though he wrote so much on other orders of *Florideæ*. The *Chlorophyceæ* were also neglected by him as a whole, though he deals at some length with the group of *Siphoneæ* in his great work *Till Algernes Systematik*, published between 1872 and 1890. This consists of a series of monographs on various genera, including descriptions of many new species, and may indeed be regarded as an amplification of parts of his earlier work, the *Species, Genera et Ordines*, mentioned above. In 1879, Prof. Agardh published an important work, *Florideernes Morphologie*, and in 1889 a monograph entitled *Species Sargassorum Australiæ*, with good coloured and other figures. In 1892, when in his eightieth year, he issued the first part of a new work on the lines of *Till Algernes Systematik*, entitled *Analecta Algologica*, and this he continued to publish till within a few months of his death. It is not to be expected that the work in these last few parts could be equal to that of his earlier life, but the very fact that a man of his advanced age could continue to work and publish the results shows his untiring energy and interest in his subject.

Prof. Agardh received much material from Australia, where Miss Hussey and others collected for him, and from his position in the world of phycology, many plants must have been continually passing through his hands. A large number of specimens in the Kew Herbarium are named in his handwriting, and the herbarium of the late Mr. Bracebridge Wilson, now in the British Museum, had been referred to him. Many of these plants are described or mentioned in his works.

Prof. Agardh was always ready to answer an appeal for help in the identity of a plant, and whenever it was necessary he would send his own type specimen for comparison. At the end of last year he was kind enough to entrust a unique specimen to a worker at the British Museum, notwithstanding his advanced age and the fact that he was most anxious to have no plant absent from his herbarium at the time of his death. The plant was returned in a few days' time, and it was not till after his death a few weeks later that a letter from his widow fully revealed the effort it had been to the aged botanist to part for even a short time with his type-specimen. Prof. Agardh's herbarium was given during his life-time to Lund University, but so long as he lived he retained the right of lending specimens. After his death, however, it was his wish that no plant should be taken out of the collection, and his herbarium will therefore be guarded as rigidly henceforward as is that of the British Museum itself.

A full share of honours from his own nation and from others fell to Agardh's lot, in recognition of his work. He was elected a foreign member of the Linnean Society in 1867, and thirty years afterwards received the gold medal of the same Society, on which occasion the then President, Dr. Albert Günther, thus summarized his work:—"There is no group of marine littoral algæ which has not been presented to us in a more orderly arrangement by the genius of Agardh. His industry and extraordinary abilities have been devoted throughout his long life to the construction of a natural system of classification of marine plants, and his labours have been crowned with the success of universal acceptance."

E. S. B.

SHORT NOTES.

Hayling Island Plants.—On September 13th, 1900, I spent some hours here, mainly devoted to examining the various forms of *Salicornia*; a few other things were incidentally met with, which may be worth mentioning. I am indebted for assistance in determining them to Mr. Arthur Bennett and Rev. E. F. Linton.—*Lepigonum ?* A remarkable form occurred, having the general habit of *L. neglectum* Kindb., but with a strong, woody, doubtless perennial root, numerous interlaced stems, and smooth (not papillose) seeds, mostly winged. But for this membranous margin, Mr. Bennett "would have called it *L. fasciculare* Lönnroth, Obs. Pl. Suec. p. 13 (1854), who says, 'media fere est inter *Lepigonum marinum* Wahl. et *L. salinum* Fr.'"—*Chenopodium botryodes* Sm. Very local, a short mile east of Hayling Bridge; usually smaller than the Pegwell Bay (East Kent) plant, but evidently the same species, and quite different from *C. rubrum* var. *pseudobotryoides*. New for Hampshire, and I believe also for the English south coast. — *Salicornia stricta* Dum. By far the most abundant saltwort; conspicuous by its erect habit and its bright, translucent green colour. Seeds ovate-oblong, very hairy. — *S. ramosissima* Woods. I only saw this at one spot, near the station for *Chenopodium botryodes*, but no doubt it grows in other parts of the island.—*S. pusilla* Woods. This, the chief object of my search, was met with in abundance about a quarter of a mile east of the bridge; it is a very characteristic little plant, usually 2–3 in. high, but occasionally as much as 6 in. (these taller specimens branched freely), erect, grey-green in colour. It was in full flower at this season. I had only seen it previously in Herb. Woods, kindly lent to me some years ago by Mr. Townsend. — *S. lignosa* Woods. Mr. Bennett concurs in referring to this a strong woody-rooted plant which is locally plentiful at the south end of the bridge. Unlike the forms of *S. radicans* Sm. that I have met with here or elsewhere, it produces numerous erect or ascending branches; their flowering tops are stout, and of a clear pale green. The young seeds were covered with short stiff hairs, almost giving them the appearance of being tuberculate. In Fl. Hants this is reduced to a variety of *radicans*, with which Mr. Bennett agrees; having regard to their very different habit when growing, I feel considerable doubt about the matter, which deserves further investigation. — *Zostera marina* L. var. *angustifolia*. Plentiful near Hayling Bridge, together with typical *Z. marina* and *Z. nana*; I examined the fruit while fresh with a strong lens, but it did not then appear to be furrowed. Mr. Bennett writes that Prahl (Krit. Pl. Schleswig-Holstein, p. 211) denies the identity of *Z. angustifolia* Reichb. with var. *angustifolia* Hornem. (Flora Danica, t. 1501), an earlier name (1816) than that of Fries; and that Prahl further suggests Reichenbach's *angustifolia* being *Z. marina* × *nana*. It is quite possible that we have *two* plants in Britain under the name of *angustifolia*, and the southern form (usually much more luxuriant) may perhaps be a hybrid, though it fruits freely; but the *angustifolia* of Inverness, Ross, and Sutherland is certainly not so, being found where typical *marina* is absent, though frequently accompanied by *nana*. I have seen "*angustifolia*" in several stations, but I have never been able to find connecting links between it and typical *marina*.—*Spartina Townsendi* H. & J. Groves. Several strong tufts were observed a little south of the bridge; an extension of its known range eastwards. Comparing these with the *S. stricta* of the same locality, the divergence was seen to be great; this good species has been somewhat disrespectfully treated in the *Student's Flora*, ed. 3, p. 471.—E. S. Marshall.

Scirpus maritimus.—During last summer and autumn Mr. Fred. Davey and myself (he was the first to find it) noticed a very marked variety of *Scirpus maritimus* L., which does not appear to have received any special notice in England, though it certainly seems to merit a distinctive varietal name, which on the continent has been, I find, assigned to it. Var. b. *compactus*, in which all the spikes of the inflorescence are gathered together into a compact clump, is, I believe, more or less common wherever the type occurs at all plentifully, but in the variety I refer to the entire inflorescence is reduced to a single spike. This variety was, so far as I have been able to ascertain, first defined by Dr. O. W. Sonder in his *Flora Hamburgensis* (1851), p. 27, as follows:—"Var. δ *monostachys*—spicula solitaria"; and there is in the British Museum Herbarium one continental specimen, exactly agreeing with our Cornish specimens, which was received duly labelled "*monostachys* Sonder." The variety is noticed in Ascherson's *Flora of Brandenburg* (i. 754), where it is said to be rare. No doubt it is merely a depauperated form of *maritimus*, just as *macrostachys* and *cymosus* (? = *umbellatus*) are very luxuriant forms; but at first sight it seems difficult to account for these excessively depauperate forms, which are to be found growing side by side with typical *maritimus* and *compactus*. A. O. Hume.

Hypnum rotundifolium Scop. in East Gloucestershire. — This spring we had the good fortune to rediscover this rare British moss near Stroud, Gloucestershire (v.-c. 33). The exact locality we withhold for prudential reasons. Specimens have been submitted to Dr. Braithwaite and Mr. A. J. Wheldon, who assure us we are not mistaken in its identification. We understand that it is not now to be found in the only locality recorded in Dr. Braithwaite's *British Moss-Flora* and Dixon's *Handbook*, where previously it had been gathered by Mr. Binstead, and therefore the spot in which we discovered it to be growing remains at present, as far as we know, the only locality in Britain. It was apparently well established, and in good fruiting condition. We are hoping, through the medium of the Moss Exchange Club, to distribute a few specimens to its members.—Geo. Holmes and E. J. Elliott.

Set of British Hieracia (p. 105).—In the sixth Fascicle, lately issued, *H. surreianum* F. J. Hanbury, var. *megalodon* E. F. Linton is rightly numbered 148 in the Table of Contents and on the label, but by a slip of the pen appears as 147 in the Preliminary Remarks and in the Index.—E. F. Linton.

NOTICES OF BOOKS.

Plant Names.

Flore Populaire, ou Histoire Naturelle des Plantes dans leurs rapports avec la Linguistique et le Folk-lore. Par Eugène Rolland. Tom. iii. [Caryophyllaceæ—Rutaceæ]. Paris: Libraire Rolland. 1900. 8vo, pp. 378. Price 8 fr.

Irish and Scottish Gaelic Names of Herbs, Plants, Trees, etc. By Edmund Hogan, S.J., John Hogan, B.A., and John C. MacErlean, S.J. Gill, Dublin; Nutt, London. 1900. 8vo, cloth, pp. xii, 137. Price 3s. net.

M. Rolland's work continues to make steady if not rapid progress, and, as is the nature of such compilations, becomes more exhaustive as it proceeds; the list of additional works cited in this volume fills nearly three pages, so that there must already be a considerable accumulation of information supplementary to the two earlier parts. It is of course of the essence of a work of this kind that finality can never be attained; a fact which none know better than the compilers themselves.

In the present instalment more than a hundred pages are devoted to the Vine, which is treated under numerous heads—the plant as a whole; its various parts; the names of its various cultivated forms; proverbs, popular sayings and customs connected with its growth and with the seasons which affect it; and a long list of books in which some of these points are amplified.

We are still unable to discover the principle upon which M. Rolland includes or excludes names. The most trivial variants of French names are included, but with regard to other countries, if England may be taken as an illustration, a process of exclusion is carried out. For example, only two of the eight names given in the *Dictionary of English Plant-Names* for *Hypericum calycinum* are taken up by M. Rolland; of *Geranium sylvaticum*, two out of four; of *Malva sylvestris*, five out of seventeen, many of which, however, are mere variants: and this process of selection seems to be pretty generally adopted. It is curious, by the way, that so conspicuous a plant as the *Hypericum* mentioned should have but one popular French name, and that only at Quimper; the other French name given—"millepertuis à grandes fleurs"—is from a book, and suggests the inquiry as to how far it is desirable to include obviously manufactured titles in a work of this kind.

As we have said before, it is to be regretted that M. Rolland does not submit his proofs to some botanist for revision as to the names given to the plants. He includes, for example, the genus *Elatine* in Caryophyllaceæ, and gives as English names for it, on the authority of Ray, "fluellin, speedwell," which of course the English botanist applied to *Linaria Elatine* and *L. spuria*. He includes in the Tiliaceous genus *Corchorus*, *C. japonicus*, which is an old name for *Kerria japonica* in Rosaceæ. We note a few misprints—*e. g.* on p. 180 "Saint Columbus-wort" should be "Columba's wort."

M. Rolland quotes freely from Mr. Cameron's *Gaelic Names of Plants*—a work which has been reviewed in this Journal. The cautionary attitude which we felt it necessary to adopt with regard to Mr. Cameron's work is more than justified by the criticisms passed upon it by Father Edmund Hogan in his *Gaelic Names of Herbs*. Father Hogan, however, is wrong in supposing that Mr. Cameron is dead, and that his work is no longer on sale; the new edition, published last year, was noticed in this Journal for 1900, p. 450. Father Hogan's list will be far more useful to M. Rolland than Mr. Cameron's book, but he may find some difficulty in determining the botanical synonyms of the plants indicated by their English equivalents, and in the transliteration of the Gaelic characters in which Father Hogan prints his names. It is a scholarly piece of work, and the compiler has brought together not only all the published but much unpublished matter bearing on the subject. Besides the names of plants, words "immediately connected with agriculture, horticulture, wood, corn, etc." find a place; there is an "English-Gaelic" as well as a Gaelic list.

We could have wished that Father Hogan had not "resisted the temptation" to explain the meaning of certain names and their connection with Irish and Scottish folklore. As it is, however, he has made a serious contribution towards the bringing together of a complete collection of Gaelic names, and we doubt not that in M. Rolland's next part he will add it to the list of the books he has cited.

Cours de Botanique. Par GASTON BONNIER et LECLERC DU SABLON. Tome I., fascicule 1. 8vo, pp. 1–384, figs. 1–553. Peelman: Paris, 1901. Subscription price to complete work, 20s.; each fascicle separately, 4s. 9d.

THIS Course of Botany, for the use of students in Universities, in Schools of Medicine and Pharmacy, and in Schools of Agriculture, will form two volumes of about 2500 pages in all, with more than 3000 figures. It will appear in six fascicles, the last of which is promised for 1903.

From the table of contents issued with the first fascicle we note the division of the subject-matter into twelve parts—namely, i. "Généralités," a general introduction; ii. Morphology of Angiosperms; iii. The Groups of Angiosperms; iv. Gymnosperms; v. Vascular Cryptogams; vi. Muscineæ; vii. Thallophyta; viii. Physiology; ix. Experimental Morphology; x. Botanical Geography; xi. Paleontology; xii. Variation. The authors claim to have followed a new plan. The description and the anatomy of plant organs are studied in a number of typical examples selected from common plants. The account of plant families includes not only the external characters usually described, but also their more interesting anatomical peculiarities and their application to agriculture, industry, and medicine. A large space is given to the study of plant diseases, plant geography and paleontology, and to "experimental morphology"—that is to say, the influence of environment on the structure of plants. The authors have also made the history of botanical discoveries the object of special researches, the results of which are described at the end of the different parts of the work, while some of the more characteristic figures from these "ancient authors" are reproduced. The description of facts illustrated by concrete examples takes precedence of generalizations deduced therefrom; the reader can thereby discriminate the proven from the hypothetical. Finally, the three thousand odd figures have all been drawn specially for the work, the majority from nature.

The present fascicle contains the first part (pp. 1–138), which includes an introduction and a short account of the general structure of plants, and about half of the second part (pp. 139–384), which deals with the morphology of Angiosperms. This is treated in six chapters, devoted respectively to stem, leaf, root, flower, frui and seed, and development. In the first part we note a somewhat full account of the various forms of cell and tissue elements, the methods of wall-thickening and the development of vessels being especially well explained and illustrated. In the second part the structure and arrangement of primary and secondary tissues is worked out by a study of various types. Thus for the primary structure of the stem we have *Mercurialis annua*, *Spartium junceum*, *Veronica Beccabunga*, *Convolvulus arvensis*, for dicotyledons; and for monocotyledons, *Zea Mays*, *Hordeum murinum*, *Phœnix dactylifera*, and *Convallaria majalis*. Diagrammatic drawings illustrating the course of the bundles, and the arrangement of tissues in transverse section, and drawings of histological preparations under higher magnification are freely supplied. There is no doubt something to be said for this type method of studying plant structure, though, taking into consideration the attention which is now paid to practical work, the teacher may prefer to relegate such study of types to the laboratory and to look to the text-book to correlate and gather into one general account the facts which have been thus elaborated.

Two useful features of this work are the *résumé* at the end of each part and the short historical review. Thus at the end of part i. we find a short account of the work of Hooke, Grew, Malpighi, Schleiden, and others on the cell and tissues, with reproductions of some of their figures. The historic side is so often neglected that we are glad to note that the authors have made its introduction one of the special points in their work.

A. B. R.

*ARTICLES IN JOURNALS.**

Bot. Gazette (23 Feb.).—H. C. Cowles, 'Physiographic Ecology of Chicago.'—J. Donnell Smith, 'Undescribed Plants from Central America' (1 pl.).

Bot. Zeitung (1 March). — R. Meissner, 'Ueber das Verhältniss von Stamm- und Nadellänge bei einige Coniferen' (1 pl.).

Bull. de l'Herb. Boissier (28 Feb.). — O. & B. Fedtschenko, 'Matériaux pour la Flore du Caucase' (cont.). — J. Freyn, 'Ueber neue bemerkenswerthe orientalische Pflanzenarten.' — J. Huber, 'Plantæ Cearenses.'—G. Hegi, 'Das Obere Toesstal.'

Bull. Torrey Bot. Club (2 March).—F. E. Lloyd & S. M. Tracy, 'Insular Flora of Mississippi and Louisiana.' — E. P. Bicknell,

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

'Nomenclature of New England Agrimonies.' — F. V. Coville, 'Home of *Botrychium pumicola*' (1 pl.).—E. L. Morris, 'N. American *Plantaginaceæ*' (1 pl.). — G. N. Best, 'Revision of N. American *Heterocladium*' (2 pl.).

Gardeners' Chronicle (2 March).—*Pelargonium inæquilobum* Mast., sp. n.

Journal de Botanique ("Août" and "Septembre" 1900, received 26 Feb.; "Octobre," received 14 March). — C. Sauvageau, 'Remarques sur les Sphacélariacées.'—(Aug. & Sept.). N. Patouillard & P. Hariot, 'Champignons du Sénégal et du Soudan' (1 pl.).—(Sept. & Oct.). Ph. van Tieghem, 'Sur les Dicotylédones du groupe des Homoxylées.' — (Oct.). A. de Coincy, 'Espèces critiques du genre *Echium*.'

Oesterr. Bot. Zeitschrift (March).—J. Brunnthaler, S. Prowazek, & R. v. Wettstein, 'Vorläufige Mittheilung über das Plankton des Attersees.' — V. Schiffner, 'Ueber *Makinoa*' (1 pl.). — P. Magnus, 'Zur les drichte der Untersucheidung des Kronenrostes der Gräser in mehrere Arten.'—R. Frieb, 'Der Pappus als Verbreitungsmittel der Compositenfrüchte.'

Rhodora (March).—M. L. Owen, 'Ferns of Mount Toby, Mass.' M. L. Fernald, 'Northeastern Carices' (Vesicarieæ).' — Id., *Juncus tenuis* var. nov. *Williamsii* (1 pl.).—R. G. Leavitt, 'Embryology of *Spiranthes cernua*.'

Trans. Linn. Soc., 2nd S. vi. 1 (Jan.).—N. E. Brown, &c., 'Two Collections made by F. V. McConnell & J. J. Quelch at Mount Roraima, British Guiana' (14 pl., see p. 151).

BOOK-NOTES, NEWS, &c.

UNDER the auspices of the U.S. Department of Agriculture, Mr. Newton B. Pierce has published (Bulletin no. 20) an exhaustive treatise on the disease of Peach Leaf-curl. He has been engaged on the work, the results of which are here tabulated, since 1893. The disease has been long recognized to be caused by a fungus; *Exoascus deformans*, which attacks the leaves and twigs, causing in both cases swelling and deformation, with complete destruction of the foliage and consequent loss of fruit, which "ceases to grow, yellows, wilts, and likewise falls." Mr. Pierce finds that the fungus develops on the upper surface of the leaf only, and that the irritation or stimulation caused by the parasite induces an abnormal development of the tissues of the host, resulting in the folding over and crumpling of the leaf and in the swelling of the diseased branches. It was thought that the mycelium harboured during the winter in the twigs and branches of the trees, and that in spring it developed with the growth of the leaf.

MR. PIERCE has proved that infection from this source is comparatively trifling, that each season's attack is due to direct infection of the young leaves from spores that have wintered on twig or bud, and that germinate in spring on the newly formed leaves. He found that these spores could be killed and the disease effectually checked by spraying the trees with some fungicide about three weeks before the buds opened. The value of spraying the dormant trees had been already proved by growers in California; they had been using various kinds of insecticide on their fruit trees to destroy the San José scale during the winter, and they found that the peach trees so treated were comparatively free from leaf-curl. Spraying the trees after the leaves had developed and the fungus had taken hold is found to be very ineffective in curing the disease. Some of the most striking results were obtained on trees known to be liable to the disease, of which the half only was sprayed, the other half being protected from the spray by a large canvas stretched through the tree. On the branches sprayed the leaves grew in a healthy and luxuriant manner, and the yield of fruit was large. On one such tree 718 peaches weighing 284·8 pounds ripened; on the unsprayed portion 92 per cent. of the leaves dropped off the tree, and only 40 peaches weighing 14·3 pounds came to maturity. The volume is profusely illustrated by figures and by thirty beautiful plates from photographs of trees sprayed and non-sprayed, and of healthy and diseased branches and leaves.—A. L. S.

THE second part of the Australian portion of the *Illustrations of the Botany of Cook's Voyages* has been passed for press, and will be issued almost immediately by the Trustees of the British Museum. The illustrations are brought down to the end of Gamopetalæ; a third part will complete the work. The Trustees have also ready for publication the concluding portion, dealing with the Cryptogams, of the Welwitsch Catalogue.

THE most recent part of the Transactions of the Linnean Society (dated January last) is devoted to an account of botanical collections made by Messrs. F. V. McConnell and J. J. Quelch at Mount Roraima, British Guiana. Mr. N. E. Brown has undertaken the phanerogams, except the Orchidaceæ for which Mr. Rolfe is responsible; the ferns and their allies are by Mr. C. H. Wright; the mosses by Dr. Brotherus; the hepatics by Dr. Stephani; and the fungi by Mr. Massee. There are two new genera—*Quelchia*, a Composite allied to *Moquinia*, and *Connellia*, the latter based upon two species described by Dr. Mez under the one name of *Puya Augustæ*: these and other interesting novelties are illustrated by fourteen excellent plates.

THE first issue of "the Victoria History of the Counties of England"—a work of imposing appearance—is devoted to Hampshire. The natural history of each county is to be a feature of the series, and the editor has been fortunate in securing for this first instalment the services of Mr. Frederick Townsend, who contributes a well-written and interesting introduction dealing with the flowering plants. This limitation should be borne in mind in connection with the statement, "it is remarkable that endemic species are not found in Great Britain"; even as limited, this seems a little too absolute. The botany of each district (according to the *Flora of Hampshire*) is epitomized, and Mr. Moyle Rogers contributes a special account of the roses and brambles.

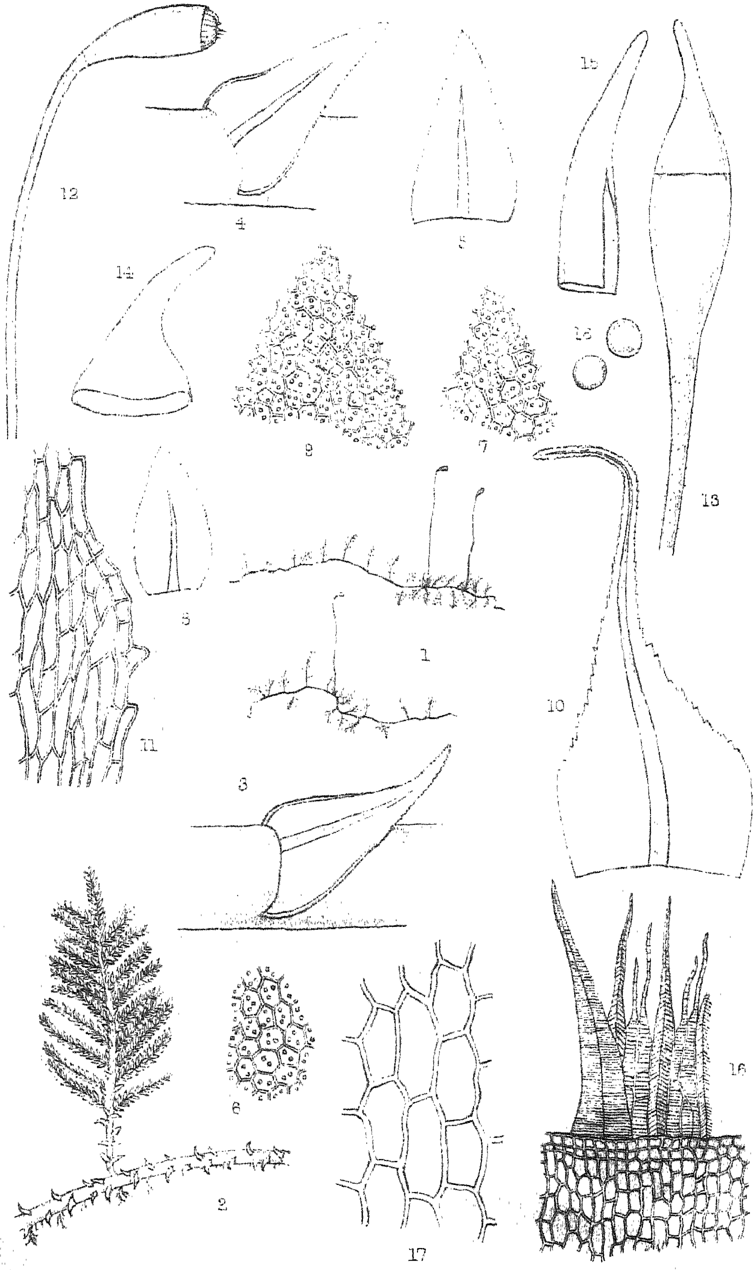
The Cryptogams are dealt with by various authors. Mr. H. N. Dixon has undertaken the Mosses and Liverworts; Mr. W. H. Wilkinson the Lichens; Mr. E. M. Holmes the Algæ; and the Rev. W. L. W. Eyre the Fungi. It is much to be regretted that the contributions of these authors were not made to conform to one plan. As it is, Mr. Dixon gives a suitable introduction to the Mosses, followed by a short list of "some of the less common species"; the Liverworts occupy only half a page. Mr. Wilkinson writes a brief general introduction to the classification of Lichens, with notes on their uses—both entirely out of place in a work like the present—followed by what seems to be a complete county list. Mr. Holmes writes half a page about the Freshwater Algæ and a page and a half concerning the Marine, but gives nothing in the shape of a list; he mentions several seaweeds as "new to Britain," a statement which, he informs us in a footnote, means that they have been detected in this county since the publication of Harvey's *Phycologia Britannica* half a century since. Mr. Eyre's contribution consists mainly of a list of Fungi, with a short introduction. From this description it will be seen that for purposes of comparison or tabulation the material is practically useless: it is to be hoped that other counties will receive more adequate, or at any rate more consistent, treatment. We note, by the way, that Mr. Townsend says the Spartinas "are used for thatching, and are locally called Sage!" There seems little ground for wonder at this if "Sage" be regarded as a local pronunciation of "sedge"—a name often extended to plants other than *Carex*.

To the Flora Exsiccata Bavarica published by the Botanical Society of Regensburg are now added two fascicles of Mosses and Hepatics, each containing twenty-five specimens. These may be obtained by purchase or by exchange. Enquiries should be addressed to Herr Dr. T. Familler, Karthaus-Trull, bei Regensburg.

"The Nomenclature of the New England Agrimonies" is being discussed so warmly by Dr. B. L. Robinson in *Rhodora* and Mr. E. P. Bicknell in the Torrey *Bulletin* as to suggest that "New England Acrimonies" would form a more suitable title for the papers.

The Report of the Botanical Exchange Club for 1899, for which the Rev. W. R. Linton is responsible, has just been published. We hope to give some extracts from it in our next issue.

We have received the third part of Mr. F. M. Bailey's *Flora of Queensland*, in which the enumeration is brought down to *Gentianaceæ*.



E.S.Salmon del.
B.Alcock lith.

West, Newman imp.

Thuidium Brotheri. *Salmon.*

THUIDIUM BROTHERI, sp. nov.

By Ernest S. Salmon, F.L.S.

(Plate 421.)

Dioicum?, minutulum, dense cæspitosum, bipinnatum, ramis pinnatis remotis 2–5 mill. altis frondes oblongas minutas simulantibus, cæspitibus dense intricatis amœne viridibus ætate nigro-viridibus, caule depresso-prostrato gracili arcuato radiculoso paraphyllis subnullis, foliis caulinis parvulis remotis (caulis apicem versus confertioribus) patentibus apice sæpe reflexis e basi cordata amplexante breviter acuminatis vel subtriangularibus margine infra revoluto, foliis rameis parvulis e basi latiore ovatis acutis nervo concolori pellucidiore, cellulis parvis distinctis subhexagono-quadratis circiter 8 μ latis dense papillosis, paraphyllis nullis vel perpaucis magnis solitariis, foliis ramulinis minutis ovatis vel ovalibus acutis, foliis omnibus siccitate contortulis margine cellulis prominulis et papillis papilloso-crenulatis, nervo sub apice evanido et dorso aspero, perichætio radicante, foliis perichætialibus majoribus pallidis tenuioribus, externis e medio patentibus vel patulis e basi late ovata longe et anguste acuminatis dentato-serrulatis, nervo crassiusculo fere ad apicem cuspidis flexuosæ denticulatæ producto, cellulis lævibus quadrangulis et elongato-quadrangulis, capsula in pedicello gracili rubello circiter 1½ mill. longo apice scabrello oblonga vel turgide oblonga horizontali parvula circiter 1 mill. longa asymmetrica leptoderma lævi fulvella siccitate infra os strangulata ætate arcuata interdum subapophysata, peristomii dentibus et processibus æquilongis, externi dentibus siccitate inter processus incurvis, ciliis 2–3 paulo brevioribus e membrana ad vel ultra dentium medium exserta orientibus, annulo revolubili e una vel duabus cellularium seriebus composito, operculo rostrato, calyptra cucullata lævi, sporis minutis lævibus circiter 12 μ diam.

Patria. India; Chanda district, Central Prov. (*J. F. Duthie*, no. 10,047 in Herb. Kew.).

Species minuta, ramis remotis frondiformibus et paraphyllis nullis vel subnullis distinguenda; *T. contortulæ* (Mitt.) affinis.

T. Brotheri quite approaches in habit the species of the section *Pelekium* of the genus, but differs in its smooth cucullate calyptra. Dr. V. F. Brotherus, who has worked specially at Indian bryology, remarked on a specimen sent to him: "I am in possession of very ample material of *Thuidia* from India. The species sent by you is not identical with any of the new species I have proposed, and seems undescribed."

Description of Plate 421.

Thuidium Brotheri, sp. nov.—Fig. 1. Portions of plants, nat. size. 2. Part of stem, with branch, × 12. 3, 4. Two stem-leaves, × 150. 5. Leaf from branch, × 150. 6. Areolation of same, at one-third from the base, × 400. 7. Apex of same, × 400. 8. Leaf from branchlet, × 150. 9. Apex of same, × 400. 10. Perichætial leaf, × 52. 11. Areolation of same, at one-fourth from the base, × 255. 12. Ripe capsule, × 12. 13. Capsule, with operculum, × 25. 14. Operculum, × 25. 15. Calyptra, × 25. 16. Portion of peristome, × 150. 17. Cells of the exothecium, × 255. 18. Spores, × 400.

A KEY TO BRITISH HEPATICÆ.

By Symers M. Macvicar.

The following key being intended for the less advanced student and for beginners, I have used easily-observed characters as far as possible, and have only made use of those derived from the inflorescence or perianth where these are necessary, or are generally present. This unavoidably lessens the exactness of the key, but it seemed better not to depend mainly on characters which are either rarely to be found in the British species, or are too difficult for beginners.

Where there is only one species in a genus, I have not given the character of the genus, but the characters which distinguished the species. The inflorescence should be known in every case, but, as this is the stumbling-block of beginners, a few hints on the subject may be given. In the first place, it is absolutely necessary that the student be sure that he has an entire plant before him. Let him take a tuft of the plant to be examined, place it in a saucer with water, gently knead it with the fingers to remove the soil, and partially to separate the stems; then place it in another saucer with water, and disentangle an entire plant with needles. This is the most difficult part with the inflorescence of small species as *Cephalozia*, the stems being very delicate and closely interwoven. In such cases it is sometimes advisable to use camel-hair brushes instead of needles. With paroicous species the antheridia will seldom be found beneath old perianths: it is better to examine plants with perianths which are immature. If it is a paroicous species which innovates beneath the mature perianth, swollen bracts with antheridia may be seen towards the apex of the branches, and young female flowers be detected by turning down the uppermost leaves. The male bracts of a large number of species resemble the ordinary leaves, except that they are more swollen at base, and are imbricated. They may form a terminal spike, or give an interrupted appearance to the middle of the stem. Some genera have their inflorescence on short lateral or postical branches, the male bracts often forming a small catkin, and differing from the leaves. They are usually readily detected, but the student must not expect to find the inflorescence in every plant. Much care and patience are required, but with a little practice it becomes not difficult to detect male bracts, and young or sterile female flowers. In the swollen male bracts there is very frequently to be seen an air-bubble, which must not be mistaken for an antheridium. With minute species the finding of the inflorescence is a matter of manipulation which must be overcome. In dissecting off leaves of *Acolea* (*Cesia*) species for examination, the student must be sure that they are not female bracts which he has taken, as these differ in shape from the leaves.

The genera are those used by Mr. Pearson in his *Hepaticæ of the British Isles*, as far as has yet been published. The remainder are familiar, with the exception of *Calycularia*, where I have followed

Stephani in his *Species Hepaticarum*, in preference to what has been generally named *Mörckia* or *Dilæna*. *Ricciocarpus natans* has been included with *Riccia* for the purposes of the key. *Jungermannia crenulata* Sm. will be found under *Eucalyx*. *Marsupella conferta* and *M. alpina* are placed under *Acolea*. *M. revoluta* is omitted, as the evidence for its occurrence in the British Isles is considered insufficient. I have also followed Stephani in considering our *Riccia nigrella* to be different from De Candolle's plant, and have employed the name *R. Pearsoni* given to it in *Species Hepaticarum*.

The following contractions have been used :—

ant. .	*antical.*	post. .	*postical.*
int. .	*internal.*	occ. .	*occasionally.*
m. or l.	*more or less.*	stips. .	*stipules.*
per. .	*perianth.*	usu. .	*usually.*

GENERA.

1 Plant foliose 2
Plant frondose 48

*

2 Leaves and stips. equal, or nearly equal, in size and shape 3
Leaves and stips. (if present) not resembling each other 12

*

3 Leaves entire or repand dentate .... *Scalia Hookeri*
Leaves lobed 4

4 Leaves 2-lobed 5
Leaves 3–4-lobed 9

5 Lobes entire or slightly dentate 6
Lobes spinous-dentate or laciniate-ciliate 8

6 Leaves usu. falcate-secund with long subulate acuminate segments ... *Herberta adunca*
Leaves erect or slightly secund, segments not subulate 7

7 Leaves $\frac{2}{3}$ bilobed, usu. closely imbricate, rarely distant ...... *Anthelia*
Leaves $\frac{1}{4}$–$\frac{1}{3}$ bilobed, distant, plant smaller ...... *Hygrobiella laxifolia*

8 Leaves spinous-dentate, plant red .... *Mastigophora Woodsii*
Leaf-segments with long hair-like processes, plant cream-coloured or pale green .... *Trichocolea tomentella*

9 Leaves divided to base into setaceous segments 10
Leaves not divided to base into setaceous segments 11

10 Segments incurved, mostly 2 cells broad at base ...... *Lepidozia setacea*
Segments spreading, 1 cell broad throughout ... *Blepharostoma trichophyllum*

11 Leaves erect, segments entire or spinous-dentate ...... *Chandonanthus setiformis*
Leaves almost transverse, segments longly ciliate .... *Blepharozia*

*

12 Capsules opening irregularly .... *Fossombronia*
Capsules opening with four entire valves 13

13 Leaves complicato-bilobed 14
Leaves not complicato-bilobed 27

*

14 Post. lobe smaller than ant. lobe 15
Post. lobe equal to or larger than ant. lobe 20

*

15 Stipules present 16
Stipules absent 19

16 Post. lobe saccate 17
Post. lobe not saccate (exc. *Lej. calyptrifolia*) 18

17 Leaves entire ....*Frullania*
Leaves spinous-dentate ....*Jubula Hutchinsiæ*

18 Post. lobe lingulate or oblong ....*Porella*
Post. lobe not lingulate or oblong ....*Lejeunea*

19 Minute; lobes nearly equal or ant. lobe echinate ....*Lejeunea*
Larger; post. lobe much smaller than ant. lobe; rootlets arising from post. lobe ....*Radula*

*

20 Inner bracts not united to form a perianth ....*Acolea*
Inner bracts united to form a perianth 21

21 Per. adherent to the bracts ....*Marsupella*
Per. free 22

22 Per. compressed, bilabiate ....*Scapania*
Per. not bilabiate 23

23 Postical branches present 24
Branches lateral, very rarely postical 25

24 Lobes dentate or spinous-dentate, stips. numerous...*Cephalozia dentata*
Lobes entire, stipules absent; lateral branches also present .... *Eremonotus myriocarpus*

25 Whole margins of lobes acutely dentate-serrate...*Prionolobus Turneri*
Margins of lobes entire, or toothed at upper part only, or with a tooth near the base 26

26 Leaves $\frac{3}{4}$ divided, lobes very unequal; ant. lobe at least twice longer than broad ....*Diplophyllum*
Leaves $\frac{1}{2}$ or less divided, with ant. lobe not twice longer than broad; or lobes equal, or ant. lobe almost reduced to a tooth...*Jungermania*

*

27 Stems flagelliferous, leaves 3–5-toothed or lobed 27
Stems not flagelliferous combined with leaves 3–5-toothed or lobed...29

28 Stips. to about $\frac{1}{2}$ divided or lower, segments narrow; leaves usu. 4-toothed ....*Lepidozia*
Stips. hardly more than notched, segments broad; leaves usu. 3-toothed ....*Bassania*

29 Leaves whitish, translucent, more rarely pale green, flat or convex, stips. large, emarginate, or 2–4-toothed 30
Leaves green or brown; if whitish, then concave 31

30 Leaves incubous, entire or shortly 2-toothed ....*Kantia*
Leaves succubous, irreg. or deeply 2-toothed, or the upper entire...... *Lophocolea*

31 Leaves with an inflexed auriculate post. lobe; plant large, purple ... *Pleurozia cochleariformis*
Leaves without an auriculate lobe (except *Cephalozia curvifolia*)...32

32 Leaves cuneate, occas. subrotund, with narrow base; plant brown, minute, epiphytic ....*Clasmatocolea cuneifolia*
Leaves not cuneate or subrotund, with narrow base 33

33 Stems erect, leaves thick, ant. margin incurved; upper leaves irreg. spinous-dentate, lower leaves entire ....*Adelanthus decipiens*
Leaves without these characters combined 34

34 Leaves vertically appressed, obliquely orbicular, very concave, trigones large, stems erect; plant ochraceous, or more rarely green. (See *Nardia compressa*.)........................*Jamesoniella Carringtoni*
Leaves without these characters combined................................35

35 Perianth absent..36
Perianth present 37

36 Cladocarpous; leaves entire..........................*Saccogyna viticulosa*
Acrocarpous; leaves lobed ....*Acrobolbus Wilsoni*

37 Calyptra partly adherent to perianth...........................*Harpanthus*
Calyptra free 38

38 Branches all postical ....*Cephalozia*
Branches mostly lateral 39

39 Cladocarpous; calyptra large, fleshy, usu. longer than the small perianth ....*Chiloscyphus*
Acrocarpous; calyptra never longer than the perianth 40

40 Leaves concave, bilobed, whitish; stips. large, ovate-lanceolate ...... *Pleuroclada*
Stips. if present not large and ovate-lanceolate 41

41 Per. m. or l. adherent to the bracts 42
Perianth free...43

42 Per. adherent almost throughout.....................................*Nardia*
Upper half or more of per. free ....*Eucalyx*

43 Leaves patent, elongate-ovate, shortly bilobed, margins incurved...... *Anastrophyllum Donianum*
Leaves not elongate-ovate and bilobed....................................44

44 Per. cylindrical, depressed at apex.................*Liochlæna lanceolata*
Per. not depressed at apex...45

45 Per. laterally compressed, bilabiate 46
Per. not bilabiate ....*Jungermania*

46 Per. contracted at mouth...*Mylia*
Per. not contracted at mouth..47

47 Rhizomatous caudex present; stems very rarely radiculose .... *Plagiochila*
No rhizomatous caudex; stems creeping, radiculose...*Pedinophyllum interruptum*

*

48 Frond with radiating lamellæ on upper surface ....*Petalophyllum Ralfsii*
Frond without such lamellæ 49

49 Several pyriform involucres close together on upper surface of frond *Sphærocarpus terrestris*
Without pyriform involucres on frond.......................................50

50 Frond m. or l. linear, with a globose dark purple involucre below the apex..*Targionia hypophylla*
No globose involucre below apex 51

51 Capsules immersed in the frond ....*Riccia*
Capsules not immersed in the frond...52

52 Capsules linear, bivalved ....*Anthoceros*
Capsules globose 53

53 Capsule solitary on a longish pedicel; frond without pores...........54
Several capsules on the under side of a stalked receptacle; frond with pores (exc. *Dumortiera*) 59

54 Plant having a perianth 55
Plant without a perianth 56

55 Section of frond showing a fascicle of smaller cells ......*Pallavicinia Lyellii*
Frond not showing such a fascicle ....*Calycularia*

56 Flagon-shaped receptacle for gemmæ very frequently present in the frond; ovate-toothed stips. present on each side of nerve beneath *Blasia pusilla*
Stips. and gemmiferous receptacle absent 57

57 Calyptra hairy; nerve of frond sharply defined ....*Metzgeria*
Calyptra smooth or papillose; distinction between nerve and lamina not sharply defined 58

58 Elaters persistent on centre of capsule; antheridia beneath warty eminences scattered on face of frond ....*Pellia*
Elaters persistent on summit of the valves; antheridia in two rows on short lateral branches..............................*Aneura*

59 Frond without pores; large wavy dark green ...*Dumortiera hirsuta*
Frond with pores 60

60 Semilunar receptacle for gemmæ usu. present on the frond .... *Lunularia cruciata*
No semilunar receptacle for gemmæ..............................61

61 Female receptacle rayed; frond usu. 1–5 in. long; receptacle for gemmæ beaker-shaped, with fringed margin ......*Marchantia polymorpha*
Female receptacle sinuate or lobed 62

62 Female receptacle conical; frond usu. 2–5 in. long, areolæ and pores very distinct..............................*Conocephalus conicus*
Female receptacle not conical; frond ¼–1½ in. long 63

63 Long hairs at base and apex of female peduncle; frond smooth when dry ....*Reboulia hemisphærica*
No hairs at base or apex of female peduncle; frond rough when dry *Chomiocarpon quadratus*

SPECIES.

FRULLANIA.

1 Ant. lobe of branch leaves, at least, usu. with a line of enlarged cells...2
Lobes without a line of enlarged cells 4

2 Stipules hooded..............................*Tamarisci*
Stipules plane 3

3 Stips. ¼ divided with obtuse usu. truncate lobes; enlarged cells scattered *fragilifolia*
Stips. ½ divided with acute lobes; enlarged cells in a continuous line *microphylla*

4 Per. tuberculate; post. lobe ½ breadth of ant. lobe..............*dilatata*
Per. smooth: post. lobe ¼–⅙ breadth of ant. lobe ....*germana*

LEJEUNEA.

1 Leaves calyptriform.............................. *calyptrifolia*
Leaves not calyptriform 2

2 Plants with stipules.............................. 3
Plants without stipules 13

3 Stipules entire ....*Mackaii*
Stipules notched or lobed 4

4 Lobes of stipules divergent.............................. 5
Lobes of stipules m. or l. incurved 6

5 Stips. rather deeply divided, lobes acute ....*hamatifolia*
Stips. only emarginate, lobes very obtuse..............................*ovata*

6 Some of the lobes of leaves equal in size 7
None of the lobes equal 8

7 Lobes mostly nearly equal, stems not rigid .... *ulicina*
Lobes frequently unequal, stems markedly rigid .... *diversiloba*

8 Per. smooth, without angles .... *Macvicari*
Per. distinctly angled 9

9 Stips. usu. twice larger than post. lobe 10
Stips. not twice larger than post. lobe 12

10 Tufted; stips. large, leaves imbricate, greenish or yellow 11
Not tufted; stips. smaller, delicate, leaves hardly imbric., often reddish .... *Holtii*

11 Pellucid, shining when dry; stips. less than three times larger than post. lobe .... *serpyllifolia* v. *planiuscula*
Not pellucid, yellow, larger, leaves more oblong; stips. of upper leaves three times larger than post. lobe .... *flava*

12 Leaves pellucid, shining when dry; stips. smaller than post. lobe; angles of per. crenulate .... *patens*
Leaves little pellucid, less shining when dry; stips. as large or half larger than post. lobe; angles of per. usu. entire ... *serpyllifolia* v. *cavifolia*

13 Leaves with styliform appendage .... *calcarea*
Leaves without styliform appendage 14

14 Leaves echinate, lobes greatly unequal .... *Rossettiana*
Leaves not echinate, lobes nearly equal 15

15 Lobes mostly acute, frequently papillose; per. rare...... *microscopica*
Lobes obtuse; perianths common .... *minutissima*

RADULA.

1 Post. lobe large, rounded-cordate, widely crossing the stem ... *voluta*
Post. lobe m. or l. quadrate, not or little crossing the stem........ 2

2 Paroicous; frequently with per. .... *complanata*
Dioicous; rarely with per. 3

3 Mature leaves very convex, brown; post. lobe tumid .... *aquilegia*
Mature leaves flat or slightly convex, brown or green; post. lobe flat... 4

4 Leaves olive or reddish brown, no gemmæ on leaves 5
Leaves usu. green, leaf-margin frequently gemmiferous ... *Lindbergii*

5 Per. compressed at apex, bilabiate; post. lobe quadrate, outer angle acute, remote from the stem .... *Carringtonii*
Per. terete, trumpet-shaped; post. lobe with upper margin usu. rounded, outer angle if present nearer the stem, plant much smaller ... *Holtii*

PORELLA.

1 Stips. ciliate-dentate, leaves usu. toothed, plant shining, acrid .... *lævigata*
Stips. entire or occ. slightly dentate at base 2

2 Post. lobe minute, lingulate-oblong, ant. lobe ovate-oblong ... *pinnata*
Post. lobe larger, broadly ovate to oblong, ant. lobe broader 3

3 Rather flaccid; leaves subimbric., post. lobe longly decurrent ...... *rivularis*
Stiff; leaves closely imbric., post. lobe scarcely decurrent 4

4 Ant. lobe obliquely ovate, trigones small, post. lobe usu. about half breadth of stips .... *platyphylla*
Ant. lobe rotund-ovate, trigones large, post. lobe nearly as broad as stips. .... *Thuja*

ANTHELIA.

Dioicous; per. oblong...*julacea*
Paroicous; per. oblong-ovate, leaves usu. with larger cells...*Juratzkana*

BLEPHAROZIA.

Tufts lax, purplish red, stems pinnate; cilia of ant. laciniæ of stem leaves shorter than the breadth of the laciniæ at their base ...... *ciliaris*
Tufts dense, tawny, irreg. branched; cilia of ant. laciniæ of stem leaves longer than the breadth of the laciniæ at their base .... *pulcherrima*

LEPIDOZIA.

1 Leaf-lobes divided nearly to base, segments setaceous...........*setacea*
Leaf-lobes not divided beyond ½–¾, segments not setaceous........... 2

2 Monoicous; base of segments 4–7 cells broad ....*reptans*
Dioicous 3

3 Usu. in compact tufts; base of segments 8–12 cells broad, andrœcia usu. at end of short post. branches ....*cupressina*
Straggling among mosses; base of segments 3–5 cells broad, andrœcia usu. at end of rather long lateral branches ....*Pearsoni*

BAZZANIA.

1 Green; leaves usu. horizontal, not much altered when dry, apex broadly truncate, stips. oblong-quadrate ....*trilobata*
Brownish or ochraceous, more rarely green; leaves deflexed, greatly so when dry, apex obliquely truncate or more rarely acute 2

2 Ochraceous; leaves reniform with large overlapping base ...*Pearsoni*
Usu. brownish; leaves oblong-ovate, base smaller, little or not overlapping, stips. usu. cordate at base ....*triangularis*

KANTIA.

1 Stips. divaricate-patent, deeply bifid, segments subulate, and with a subulate tooth; leaves with two sharp usu. divergent teeth and broad sinus ....*arguta*
Stips. lying m. or l. closely on the stem, or patent, less deeply lobed, segments never subulate 2

2 Stips. large, rotundate, emarginate or shortly lobed, segments entire; leaves typically entire and rotundate at apex...........*trichomanis*
Stips. smaller, broader than long, more deeply lobed, segments more acute, with frequently a tooth at side; leaves narrowed at apex, frequently 2-toothed, tooth often reduced to one cell......*Sprengelii*

CEPHALOZIA.

1 Stems with flagellæ 2
Stems without flagellæ 8

2 Leaves orbiculate, entire.. 3
Leaves bilobed 4

3 Stips. none, or few and minute; plant of bogs ....*Sphagni*
Stips. numerous, larger, on gemmiferous stems becoming equal in size to the leaves; usu. on stumps................................*denudata*

4 Monoicous 5
Dioicous 6

5 Per. with one layer of cells throughout, leaves ½ bifid......*bicuspidata*
Per. with two layers of cells in the middle, leaves ¼–⅓ bilobed, lobes incurved ....*pleniceps*

6 Small, leaves ⅙–⅕ divided ....*Francisci*
Larger, leaves ⅓ divided, resembling *Jung. inflata* 7

7 Acrocarpous, flagellæ few .... *heterostipa*
Cladocarpous, flagellæ numerous .... *fluitans*

8 Leaves with an inflexed auricle .... *curvifolia*
Leaves without an inflexed auricle 9

9 Leaves spinous-toothed, complicate .... *dentata*
Leaves not spinous-toothed 10

10 Stips. present on stem 11
No stips. on stem 15

11 Paroicous; involucre swollen .... *Jackii*
Monoicous or dioicous 12

12 Monoicous .... *elachista*
Dioicous 13

13 Cladocarpous; lobes of leaf ending in a claw-like apiculus ...... *æraria*
Acrocarpous 14

14 Per. 3-angled; lobes of leaf acute, cells lax, pellucid ...*Lammersiana*
Per. usu. 4–6-angled; lobes of leaf subacute, cells opaque...*divaricata*

15 Monoicous; per. longly ciliate, cilia about 5 cells long ......*connivens*
Dioicous 16

16 Bracts entire 17
Bracts toothed 19

17 Bracts ⅔ divided into lanceolate segments; leaves decurrent, with long m. or l. connivent segments .... *hibernica*
Bracts ⅓–½ divided, segments not lanceolate; mouth of per. with setæ 1–2 cells long 18

18 Per. with a single layer of cells .... *pallida*
Per. with two layers of cells in the middle .... *lunulæfolia*

19 Per. usu. 4–6-angled, acrocarpous .... *divaricata*
Per. 3-angled, cladocarpous 20

20 Leaves subimbricate, incurved when dry, usu. fulvous; mature per. 3-keeled throughout, mouth setose or ciliolate .... *catenulata*
Leaves usu. distant, whitish; mature per. 3-gonous at the upper part only, mouth minutely setulose .... *leucantha*

PLEUROCLADA.

Leaves very concave, patulous; stips. frequently with a tooth .... *albescens*
Leaves less concave, patent or erecto-patent; stips. entire...*islandica*

SCAPANIA.

(Mature leaves from middle or lower part of stem must be examined.)

1 Leaves verrucose 2
Leaves not verrucose 3

2 Ant. lobe triangular-ovate to subrotund, incumbent; plant usu. more slender, with post. lobe ciliate-dentate .... *aspera*
Ant. lobe ovate-subquadrate, erecto-patent or reflexed, apex acute, usu. much more divergent from the stem; post. lobe dentate or almost entire .... *æquiloba*

3 Lobes equal or nearly so 4
Lobes unequal 6

4 Prostrate, strongly creeping; ant. lobe rather smaller, almost oblong, outer angle divergent, rather acute .... *Bartlingii*
Ascending or erect; lobes rotundate 5

5	Leaves ⅓ divided, not undulate; cells becoming gradually smaller towards the margin, which is usu. entire	*compacta*
	Leaves ½ divided, entire and undulate, or dentate; cells punctate, becoming suddenly and distinctly smaller towards the margin: leaves softer	*subalpina*
6	Margin of leaves commonly entire or nearly so	7
	Margin of leaves ciliate or dentate	11
7	Ant. lobe reniform, very convex, about three times smaller than post. lobe	*uliginosa*
	Ant. lobe not reniform, usu. about ½ size of post. lobe	8
8	Plant small, about ½ in. or less; on banks or rock-ledges	9
	Plant larger; usu. in marshes or on wet rocks	10
9	Stems slightly radiculose, leaves rather remote, little accrescent, ant. lobe rectangular-ovate, per. ciliate; on banks and ditch-sides	*curta*
	Stems densely radiculose, leaves close, accrescent, ant. lobe ovate, per. sinuate-dentate, or entire; on rock-ledges	*rosacea*
10	Cells of leaf, except at its base, nearly equal in size, cell-walls rather thick; ant. lobe usu. with an incurved point	*irrigua*
	Cells of centre of leaf twice as large as those at the apex, cell-walls thin; ant. lobe usu. rounded	*undulata*
11	Margin of leaves ciliate	12
	Margin of leaves dentate or serrate	14
12	Post. lobe flat, horizontal	*ornithopodioides*
	Post. lobe convex, erecto-patent	13
13	Lobes ⅔ divided with straight cilia; plant green	*nemorosa*
	Lobes divided to base with irreg. curved spinous cilia; plant reddish	*nimbosa*
14	Both lobes acute and acutely serrate	*umbrosa*
	Post. lobe at least obtuse, lobes not serrate	15
15	Mature leaves ochraceous or yellowish brown; ant. lobe reniform-rotund, frequently reflexed	*resupinata*
	Leaves green or reddish, rarely ochraceous; ant. lobe subquadrate to rotund, more rarely reflexed	16
16	Bracts nearly equal; plant soft	*undulata*
	Ant. bract ⅓–½ size of post. bract; plant firm	17
17	Leaves dentate; on wet rocks	*purpurea*
	Leaves spinous-dentate or denticulate, usu. of a lighter colour, ant. lobe usu. more acute; on drier rocks	*intermedia*

DIPLOPHYLLUM.

1	Leaves with a line of elongated cells in the centre	*albicans*
	Leaves without such line	2
2	Lobes of leaves acute	*Dicksoni*
	Lobes usu. obtuse	3
3	Paroicous or monoicous; low ground plant	*obtusifolium*
	Dioicous; alpine plant	*taxifolium*

LOPHOCOLEA.

1	Upper stem leaves usu. entire or emarginate; paroicous	*heterophylla*
	Upper stem leaves never entire; leaves whitish, translucent	2
2	Leaves irregularly toothed	*spicata*
	Leaves usu. regularly 2-toothed, teeth longer	3
3	Dioicous	*bidentata*
	Monoicous; teeth longer and straighter, fertile stems more branched	*cuspidata*

HARPANTHUS.

Laxly tufted or creeping among mosses; leaves horizontal, sinus broad, shallow, $\frac{1}{7}$–$\frac{1}{8}$ deep.................................*Flotowianus*
Densely tufted, leaves more concave, nearly erect, sinus deeper, $\frac{1}{4}$–$\frac{1}{3}$ *scutatus*

MYLIA.

Papillæ present on cells of upper leaves, which are rotundate...*Taylori*
No papillæ on cells of upper leaves, which are usu. ovate ...*anomala*

PLAGIOCHILA.

1 Ant. margin of leaf much decurrent 2
Ant. margin little or not decurrent 3

2 Leaves ciliate-dentate, dentate or occ. entire; per. oblong..*asplenioides*
Leaves spinous-toothed; per. broadly obovate ....*spinulosa*

3 Post. margin of leaf with several teeth 4
Post. margin entire or rarely with a single tooth; plant small 5

4 Teeth of leaves blunt; leaves ovate-oval ....*ambagiosa*
Teeth spinous; leaves roundish-oval ....*punctata*

5 Leaves nearly horizontal, emarginate ....*Stableri*
Leaves obliquely inserted, bilobed 6

6 Stips. numerous, subulate, persistent ....*exigua*
Stips. none, or few and minute.. 7

7 Leaves firm, indigo-green, nearly black when dry; occ. a small tooth near centre of post. margin...............................*tridenticulata*
Leaves usu. rather tender, green or light brown, not becoming nearly black when dry ....*punctata*

JUNGERMANIA.

1 Leaves entire... 2
Leaves lobed 8

2 Stem with stipules 3
Stem without stipules 4

3 Leaves frequently notched, bracts entire, per. ovate to ovate-oblong, not twice longer than the bracts; on shady rocks and stones ...... *subapicalis*
Leaves entire, bracts emarginate, lobed or toothed; per. cylindrical, much longer than the bracts; on wet moors ....*autumnalis*

4 Leaves round; per. 4-angled above ....*sphærocarpa*
Leaves longer than broad; per. not 4-angled............................. 5

5 Leaves broadly cordate with narrow attachment, embracing the erect nearly rootless stem, leaves soft ....*cordifolia*
Leaves ovate or parabolic; stem creeping, with many rootlets 6

6 Paroicous; per. m. or l. lanceolate, apex narrow, acute ....*pumila*
Dioicous; per. oblong-ovate or pyriform, more plicate, apex truncate 7

7 Per. oblong-ovate; plant small, blackish green ....*atrovirens*
Per. pyriform; plant usu. larger, paler green ....*riparia*

8 Lobes of middle stem leaves 2 9
Lobes of middle stem leaves more than 2 24

9 Leaves complicato-bilobed 10
Leaves not complicato-bilobed 15

10 Ant. lobe almost reduced to a tooth ....*exsecta*
Ant. lobe equal or nearly equal to post. lobe 11

11 Stips. large, bipartite, with entire segments..................... *Kunzeana*
Stips. absent, or, if present, minute and awl-shaped 12

12 Leaves nearly parallel to stem, acutely ¾-bilobed, minute ... *Pearsoni*
Leaves patent or erecto-patent, ½-bilobed or less........................ 13

13 Leaves imbricate, lobes unequal, usu. rounded, post. lobes closely tiled .... *saxicola*
Leaves approximate or distant, upper lobes equal, usu. pointed...... 14

14 Stems little or not radiculose, lobes of lower leaves unequal; on rocks or among mosses .... *minuta*
Stems densely radiculose, lobes of lower leaves equal; on decaying wood .... *Helleriana*

15 Both margins of leaves reflexed .... *orcadensis*
Both margins of leaves not reflexed 16

16 Stipules usually present 17
Stipules absent 18

17 Lobes obtuse, oval or rotundate, sinus gibbous, reflexed .... *obtusa*
Lobes m. or l. triangular, some usu. acute .... *bantriensis*
(Stips. few or none in var. *acuta*.)

18 Lobes rounded, usu. obtuse 19
Lobes acute 20

19 Leaves obovate or subrotund, dark green; in wet places......... *inflata*
Leaves m. or l. quadrate, with larger cells, light green; on limestone *turbinata*

20 Upper leaves 3–5-lobed, undulate 21
Upper leaves rarely more than 2-lobed, not undulate 22

21 Paroicous; stem thin, plant usu. light green .... *capitata*
Dioicous; stem very thick, plant bluish green....................... *incisa*

22 Leaves closely imbricate, nearly erect, sinus acute; stem less than ¼ in. long .... *bicrenata*
Leaves not closely imbricate, patent or erecto-patent, sinus obtuse; plant larger.. 23

23 Sinus notably variable in shape, upper leaves quickly incurved when drying; plant commonly brown .... *alpestris*
Sinus not very variable, leaves slowly incurved when drying; plant commonly green, or stems red .... *ventricosa*

24 Stems usu. with cylindrical innovations .... *gracilis*
Stems without such innovations 25

25 Stipules present 26
Stipules usually absent 28

26 Leaves about as long as broad, lobes usu. 3, incurved........... *Flœrkii*
Leaves broader than long, lobes usu. more than 3....................... 27

27 Leaves nearly transverse, very concave, with incurved lobes; margin of lobes notably reflexed, sinus gibbous.................... *quadriloba*
Leaves oblique, not concave nor with incurved lobes, lobes usu. mucronate .... *lycopodioides*

28 Leaves flat, nearly horizontal .... *barbata*
Leaves undulate, oblique or transverse 29

29 Lobes of leaf obtuse, leaves concave, usu. saccate at base, embracing the stem... *polita*
Lobes of leaf acute 30

30 Stem very thick; leaves nearly transverse, ant. margin not reflexed, about equal in length to the post. margin .... *incisa*
Stem thinner; leaves oblique, post. margin curved, longer than the usu. reflexed ant. margin .... *Lyoni*

EUCALYX.

1	Rootlets white, leaves frequently reddish, usu. with a distinct marginal row of larger cells, at least in the fertile stems	*crenulata*
	Rootlets purple, or some at least hyaline red	2
2	Paroicous; bracts ½ attached to per.	*obovata*
	Usu. dioicous; one bract usu. free, the other ⅓ attached to per.	*hyalina*

NARDIA.

1	Paroicous; leaves of fertile stems usu. emarginate; per. almost at right angles to stem	*geoscyphus*
	Dioicous; leaves entire, rarely emarginate; per. not as above	2
2	Stems without rootlets, or nearly so; plant soft, brownish, aquatic	*compressa*
	Stems with many rootlets; plant firm, leaves glistening	*scalaris*

MARSUPELLA.

1	Leaves distant, scale-like	*nevicensis*
	Leaves approximate or imbricate	2
2	Paroicous or synoicous	3
	Dioicous	5
3	Sinus and lobes obtuse, rarely abruptly subacute	*olivacea*
	Sinus and lobes acute	4
4	Leaves broadly ovate to subrotund	*ustulata*
	2–3 times larger, leaves laxer, cordate at base	*sparsifolia*
5	Leaves appressed when moist, rather pellucid, deeply and acutely lobed; plant small, resembling copper wire	*Stableri*
	Leaves patent or erecto-patent when moist, opaque; plant larger	6
6	Lobes and shallow sinus usu. obtuse; margin usu. reflexed	*emarginata*
	Sinus acute, deeper, to ¼ divided; margin not reflexed	7
7	Lobes acute; plant small	*Funckii*
	Lobes rounded; leaves obovate from a narrow sheathing base, plant larger	*sphacelata*

ACOLEA.

1	Leaves patent from an erect sheathing base	*alpina*
	Leaves appressed; plant smaller	2
2	Leaves retuse, margins much lacerated, apex of stem frequently recurved	*coralloides*
	Leaves more deeply divided, margins not or little lacerated	3
3	Margins distinctly crenulate	4
	Margins not or hardly crenulate	5
4	Plant silvery white, more rarely greenish, stems clavate	*obtusa*
	Plant brown or olive, smaller, stems of nearly the same diameter throughout; marginal cells elongate	*crenulata*
5	Paroicous; leaves oval or oblong, incised only ⅛–⅙	*adusta*
	Monoicous or dioicous; incision deeper	6
6	Monoicous; reddish brown, rootlets few, short; sinus acute	*conferta*
	Dioicous	7
7	Larger, brownish yellow to greenish; leaves very conspicuous, margin reflexed in the upper leaves, sinus acute	*concinnata*
	Smaller, olive-brown or nearly black; leaves thick, margins plane, sinus rather obtuse, and forming nearly a right angle	*crassifolia*

FOSSOMBRONIA.

1 Spores furnished with papillæ 2
Spores with crests 3

2 Papillæ 20–25 on face and end of spore .... *cæspitiformis*
Papillæ about 110 on face and end of spore .... *Mittenii*

3 Crests in nearly parallel lines 4
Crests forming alveoli 5

4 Crests on face 15–24 .... *pusilla*
Crests on face 28–36 .... *cristata*

5 Margin of spores appearing as if winged; alveoli 7–10 on face of spore *angulosa*
Margin appearing as if crenulate, not winged; alveoli at least 2–3 times as numerous .... *Dumortieri*

CALYCULARIA.

Involucre laciniate, per. oblong; rootlets yellowish .... *hybernica*
Involucre lobed, plicate, per. campanulate; rootlets reddish brown; alpine plant .... *Blyttii*

PELLIA.

1 Paroicous; ant. margin of invol. absent, mouth looking towards apex of frond, calyptra much exserted; int. wall of capsule with numerous rings .... *epiphylla*
Dioicous; invol. forming a complete ring, mouth erect; fronds usu. narrower and darker-coloured 2

2 Int. wall of capsule without rings, calyptra usu. immersed; male plant with dichotomous furcate innovations .... *calycina*
Int. wall of capsule with some rings, calyptra exserted; male plant without such innovations .... *Neesiana*

ANEURA.

1 Frond simple or with a few short undivided branches, thick, fleshy, channelled above, margins usu. crisped .... *pinguis*
Frond repeatedly divided, not fleshy, margins rarely crisped........ 2

2 Branches broadly winged, stem biconvex, 6 cells thick at middle, two cortical smaller .... *multifida*
Branches not winged (margins not attenuated) 3

3 Branches erect or procumbent, frequently narrowed towards the ends, and palmatifid; usu. on logs .... *palmata*
Branches prostrate, never palmatifid, and rarely narrowed towards the ends 4

4 Monoicous; small, stems 5 cells thick in the middle, internal cells not larger than the cortical .... *latifrons*
Dioicous; rather large, stems 6–7 cells thick in the middle, internal cells larger than the cortical .... *pinnatifida*

METZGERIA.

1 Frond hairy on both sides........ *pubescens*
Frond without hairs above........ 2

2 Post. side of nerve 2, rarely 3, cells broad; hairs on margin geminate, long and curved; dioicous .... *hamata*
Post. side of nerve 4, rarely 3, cells broad 3

3 Hairs single, rarely on the margin, but just within it; dioicous ...... *furcata*
Hairs on the margin, mostly geminate; monoicous .... *conjugata*

RICCIA.

1	Frond with aerial cavities	2
	Frond without evident aerial cavities	4
2	Frond linear, dichotomously forked	*fluitans*
	Frond not linear	3
3	Frond obcordate, longly fimbriated; or lobed and deeply sulcate	*natans*
	Frond flat, not sulcate, obcuneate, lobed or furcate; surface-pits becoming numerous	*crystallina*
4	Margins of frond ciliated	5
	Margins not ciliated	7
5	Frond green on both surfaces	*ciliata*
	Frond purplish beneath	6
6	Very small, 2–3 lines long, simple or bilobed, sulcate above	*tumida*
	Larger, furcate, broadly channelled above	*glaucescens*
7	Frond green on both surfaces	8
	Frond purplish beneath	9
8	Frond almost four times broader than thick, attenuated towards the margin; fruit scattered	*glauca*
	Frond three times broader than thick, margins thick; fruit clustered	*sorocarpa*
9	Frond broadly and slightly channelled	*bifurca*
	Frond deeply and acutely sulcate	*Pearsoni*

ANTHOCEROS.

1	Spores yellow, granulose papillate; frond nearly smooth and flat, thick	*lævis*
	Spores black, or nearly so, spinous; frond warty, with crisped edges, thinner	2
2	Antheridia about 2 in each cavity	*punctatus*
	Antheridia about 20–30 in each cavity	*Stableri*

NOTES ON WELSH HAWKWEEDS.

By Rev. Augustin Ley, M.A.

Hieracium caledonicum F. J. Hanb. var. **platyphyllum** A. Ley. This plant, described by me in this Journal for 1898, p. 7, as a variety of *H. pollinarium* F. J. Hanb., apparently cannot be maintained under that species, but falls very well under *H. caledonicum* F. J. Hanb., where, therefore, I wish, with the concurrence of Mr. Hanbury and Rev. E. F. Linton, to place it. It is usually easily distinguished from the type by its leaves being much broader, the root-leaves often cordate at the base, and coarsely toothed; by its longer branches, forming a very acute angle with the stem; by its thicker peduncles, and by both peduncles and phyllaries being much more densely tomentose. Its ligules are usually, but not uniformly, stylose. It is a very much more abundant plant in South Wales than the type.

H. **vulgatum** Fr. var. **cacuminum** A. Ley (Journ. Bot. 1895, p. 86), described as a variety of *H. diaphanum* Fr., ought, I am now convinced, to fall under *H. vulgatum* Fr. I propose therefore to place it under this species, very near to var. *amphibolum* Lindeb., of which indeed it may be a mountain form. It is, however, a more slender, delicate plant, with narrower, less deeply dentate leaves, and broader blunter phyllaries.

H. RIGIDUM Hartm. var. nov. STRIGOSUM. Stem 1–3 ft., bearing abundant stiff, white, black-based hairs usually throughout its whole length; with 5–10 long lanceolate acute leaves, the upper sessile, the lowest and the root-leaves decurrent into a rather long petiole; lower surface with stiff white hairs, edge shortly ciliate, bearing several deep acute teeth. Branches long, 1–2-flowered, confined to the upper third of the stem, forming an acute angle with the stem and ascending. Heads few, large, buds ovate-truncate. Outer phyllaries short, blunt, inner long, narrow, rather acute, with conspicuously dark green centre and light margin, etomentose, bearing abundant stiff white hairs, and very few long-stalked glands near the base. Peduncles with sparse loose tomentum, eglandular. Style yellow. Near var. *longiciliatum* F. J. Hanb., but distinguished, so far as the small amount of material I have seen of that plant enables me to judge, by its stem and phyllaries being much more hairy, the hair stiffer; by its larger heads, and longer, more closely ascending branches; by its longer leaves with less hairy upper surface, less ciliate edge, deeper coarser teeth, and longer petiole. Micro-glands in the present variety usually absent, or very inconspicuous. Original root-leaves blunt. Linton's Set of British Hieracia, No. 153.

Mountain glens, mostly on river-side rocks and near waterfalls; abundant in South Breconshire.

Localities. Glyn Tarell, 1883; Blaen Taf-fawr; Cwm Taf-fechan; Hepste and Mellte Glens; Upper Nedd Glen; Upper Tawe Glen; Glyn Collwng—all on river-side rocks. On mountain cliffs at Craig Gledsiau, Glyn Tarell, and Llyn-y-fan-fawr. On dry limestone ledges at the head of Dyffryn Crawnon; on railway banks at Glyn Collwng, becoming stylose, with discoloured styles on dry railway ballast—all these localities are in South Breconshire. On the Yrfon near Abergwesyn, North Breconshire; I believe also on mountain cliffs at Llyn-y-fan-fechan, Carmarthenshire.

Plants gathered by me in Glyn Tarell first in 1883, and subsequently named by Dr. Lindeberg for Mr. F. J. Hanbury "*H. lapponicum* Fr., nov. var." (see Journ. Bot. 1889, p. 73), differ from the variety of *H. rigidum* Hartm. here described, in having darker broader less hairy phyllaries; but, as this slight difference seems due to the spray of a waterfall within the reach of which the plants named "*H. lapponicum* Fr." grow during wet seasons, and has been ascertained to disappear from the same plants during drier seasons, I am bound to express my conviction that these plants will have to be placed under the present variety of *H. rigidum* Hartm.

NEW NATAL PLANTS.

By J. Medley Wood and M. S. Evans.

(Continued from Journ. Bot. 1899, p. 255.)

[Mr. J. M. Wood's Report of the Natal Botanic Gardens for 1900, received by us on March 30th, contains the following descriptions of new species, with the prefatory note here reproduced. Up to the time of our going to press, no issue of the Kew *Bulletin* has appeared since October, 1899, so the species in question were first published in the Report, whence they must be cited. To obviate the manifest inconvenience attendant upon publication of novelties in a purely local report, we have thought it well to reprint the descriptions, a continuation, as the authors state, of those published in this Journal; for convenience of citation we have indicated, in square brackets, the original paging of the Report.—Ed. Journ. Bot.]

In my Annual Report for 1899, I repeated the descriptions of the third decade of new Natal plants described by Mr. M. S. Evans and myself, and published at home in the *Journal of Botany*. It was intended to publish a fourth decade, but the outbreak of war and press of other business prevented our obtaining specimens from the upper districts. We therefore determined to send what remained for publication in the *Kew Bulletin*, and not to continue the decades at present. The following descriptions were therefore sent for publication some months ago, and may possibly appear before this Report is published; but, as few people in Natal see that publication, I think it best to include them in this Report, especially as all the other species have already appeared in former Reports.

Senecio tugelensis Wood & Evans. Annual, herbaceous, erect, stems simple, striate, glabrous. Leaves oblong-lanceolate, or ovate-lanceolate, acute or obtuse, lower ones tapering to a winged amplexicaul petiole, upper ones amplexicaul, margins closely serrate, glabrous, purple beneath. Heads solitary, or 2-3 on somewhat elongated glabrous peduncles bearing 2-3 scattered lanceolate bracts, radiate, calycled with 6-7 linear bracteoles. Involucre of 12-14 glabrous scales. Ray florets 12-14; 4-5-lined, yellow; disc florets 60-80. Achenes (unripe) glabrous.

Habitat: Natal; sources of Tugela, summit of Drakensberg, near Mont aux Sources; 10-11,000 feet altitude. March, 1898. *M. S. Evans*, No. 750.

The whole plant 6-14 inches high; leaves 1-2 inches long, ⅜-¾ inch wide. Involucral scales ¾ inch long. Heads spreading to 1 inch diameter.

Senecio seminivea Wood & Evans. Suffruticose, ascending, branches curved, glabrescent below, glandular hairy in upper portion. Leaves crowded, alternate, sessile, half amplexicaul, pinnate, 5-7 lobes on each side, young ones very densely white woolly tomentose, mature one subglabrous, leaflets simple, entire or 2-3-lobed, acute, margins entire. Heads solitary, radiate, pedunculate, calycled with 2-3 linear glandular bracteoles. Involucral scales 10–15, glandular hairy, with membranous margins, 3–4-nerved in central portion. Disc florets 40–50; ray florets 10–12; 4-lined. Achenes glabrous. [p. 8.]

Stems 5–10 inches high; mature leaves ⅜–⅝ inch long, lobes 1½–2 lines long. Involucral scales 3–4 lines long. Ray florets extending to 1¼ inch diameter, yellow; disc florets yellow.

Habitat: Natal; summit of Drakensberg, near Mont aux Sources, 10–11,000 feet altitude. *M. S. Evans*, No. 752.

This species is apparently closely allied to *S. tanacetoides* Sond., but can at once be distinguished from that species by the peculiarity of the fascicles of young leaves being snowy white with woolly tomentose pubescence, while the adult leaves are dark green and almost glabrous, and this may be as well seen in the dried specimens as in the living ones; and also by the glandular hairs on the upper part of the stem, peduncle, and outside of involucral scales. We have only observed this species on the summit of the Drakensberg, while *S. tanacetoides* is plentiful at the foot of the mountain.

Athrixia arachnoidea Wood & Evans. Suffruticose. Stems solitary, erect or ascending, occasionally branched, terete, leafy to apex, arachnoid. Leaves alternate, erecto-patent, sessile, linear, acute, margins reflexed, glabrous or thinly arachnoid above, very densely so beneath. Peduncles 1-headed, short, terminal or axillary near apex of stem, swollen towards apex, clothed with scattered subulate, arachnoid scales similar to those on the involucre. Heads turbinate. Involucral scales pluriseriate, arachnoid, subulate, squarrose. Ray florets 20–30, disc florets about 100. Pappus uniseriate, without interposed scales, the bristles persistent, thinly clothed with minute hairs. Ripe achenes not seen.

An undershrub 6–12 inches high. Leaves in centre of stem ¾–1 inch long, 1½–2 lines wide, gradually shorter to base and apex. Peduncles 3–6 lines long. Heads 9 lines diameter. Involucral scales 3–4 lines long. Ray florets 6–7 lines long, purple; disc florets 4 lines long, yellow.

Habitat: Natal; amongst grass, Polela, about 6000 feet altitude. July, 1895. *M. S. Evans*, No. 513.

Aloe natalensis Wood & Evans. Shrubby, copiously and repeatedly branching from the very base, each branchlet ending in a dense rosette of leaves, occasionally producing adventitious roots from the lower branches. Leaves 30–40 in a rosette, linear-lanceolate, falcate, acute, subglaucous, neither spotted nor lined, margined with deltoid curved prickles. Peduncles usually simple, bracts broadly obovate, veined. Racemes densely many-flowered; pedicels erecto-patent. Perianth bright red, cylindrical. Stamens finally slightly exserted. Stigma exserted. [p. 9.]

The whole plant 8–12 feet high, with a diameter of 12–15 feet. Rosettes of leaves very numerous. Leaves 18–30 inches long; 1½–2½ inches wide; ½–⅝ inch thick at the base; prickles 1 line long, ¼–¾ inch apart. Pedicels 1–1½ inch long. Racemes 5–10 inches long, spreading to 3 inches wide, bracts ½ inch long and wide. Perianth 1½–1¾ inch long.

Habitat: Natal; Midlands from 800–3000 feet altitude, usually but not always on cliffs or rocky hills.

Differs from any species of aloe known to us, or described in the *Flora Capensis*, and well distinguished by its copiously branching habit. It forms large clumps, and covers a large extent of ground in comparison with its height. The rosettes of leaves in moderate sized plants number from 200–300 or more, with a still larger number of small ones.

Athanasia montana Wood & Evans. Suffruticose, much branched. Stems erect, terete, clothed with scars of fallen leaves, finely arachnoid, pubescent. Leaves alternate, sessile, oblong-ovate to lanceolate, acute, broad-based, margins deeply and sharply serrate; thickly covered with glands; with axillary tufts of small, entire, linear leaves. Inflorescence a compound corymb, many-headed, pedicels bracteate, bracts linear-lanceolate. Involucral scales minutely ciliolate, subsimilar. Pappus of several short papillose scales. Achenes (unripe) striate, papillose.

Plant 2–3 feet high. Leaves ½–¾ inch long, 2–4 lines wide; axillary entire ones 1½–2 lines long; heads 4 lines diameter.

Habitat: Natal; Drakensberg, source of Bushman's River. 6–7000 feet altitude. June, 1896. *M. S. Evans*, No. 662.

The nearest species to this known to us is *A. leucoclada* Harv., from which it is distinguishable by its more robust and branching habit, and also by its inflorescence being a compound corymb of many heads, and not "simple, dense, few-headed."

Geigeria rivularis Wood & Evans. Suffruticose, erect or ascending, glabrous, clothed with leaves from base to apex. Leaves linear, tapering to base and apex, entire, flat, impress-dotted, glabrous, acute, midrib inconspicuous. Heads lateral and terminal, subsessile or shortly pedunculate, subtended by many leaves. Involucral scales, outer ones linear from a broadened base, with swollen midrib; inner ones lanceolate, coriaceous, shorter than the outer ones. Pappus, outer of oblong, blunt, and inner of oblong bristle pointed scales. Receptacle covered with stiff bristles. Achenes very villous. [p. 10.]

Stem 6–8 inches in height. Leaves 1½–2 inches long, 1–1½ line wide. Heads 1¼ inch diameter. Outer involucral scales ⅛–1 inch long. Flowers yellow.

Habitat: Orange River Colony, near Harrismith, 5–6000 feet altitude. March. *J. M. Wood*, No. 4784.

This plant is very closely allied to *G. Burkei* and *G. Zeyheri*, but differs from the former in indument, shape, and size of involucral scales and fimbrils. This is not strictly a Natal plant, but, being found so near the border, and the district having not yet been very closely botanised, it is very possible that it may yet be found on the Natal side of the border. It is the only one of the series that has not been actually collected in Natal.

Geigeria natalensis Wood & Evans. Suffruticose from a thickened woody root. Stems branching, often from base, slender, erect or ascending, glabrous, leafy to base. Leaves narrow linear, glabrous, punctate, entire. Heads subtended by leaves. Involucral scales, outer one subulate from a broad base; inner ones lanceolate, coriaceous, ciliate on upper portion, longer than the outer ones. Pappus scales, outer ones oblong, obtuse; inner ones oblong, bristle-pointed. Receptacle covered with stiff bristles. Achenes very villous.

The whole plant 9–12 inches high. Leaves 1–1¼ inch long, ½–⅝ line wide. Involucral scales, outer, 3 lines, inner, 5 lines long.

Habitat: Natal; dry stony hill, Whitecliffe, near Greytown. April. *J. M. Wood*, No. 4317.

This plant differs from *G. rivularis* W. & E. by its generally much more slender habit, size and shape of leaves, and comparative size of involucral scales, and in the much smaller size of the flower-heads. Flowers yellow.

Ursinia brevicaulis Wood & Evans. Suffruticose. Stems 1 or more, erect or ascending, short, unbranched, leafy from base to apex, leaves crowded, pinnatipartite in upper portion, segments about 6, opposite or alternate, linear, simple or occasionally bifid, glabrous, punctate, acute at apex, petiole elongate, gradually dilated towards base, semi-amplexicaul, glabrous. Peduncle 1-headed, elongate, thinly clothed with minute hairs. Involucral scales glabrous, outer ones dark-edged, inner larger, amply membrane-tipped, all obtuse. Palæ a little constricted below apex, terminating in a rounded membranous lobe.

Stems ½–1 inch long. Leaves 1–1¾ inch long, petiole below lowest segments, ⅝–1¼ inch long; segments 2–3 lines long. Peduncles 2½–5 lines long. [p. 11.]

Habitat: Natal; summit of Mont aux Sources, 10–11,000 feet altitude. March, 1898. *M. S. Evans*, No. 744.

Lythrum rivulare Wood & Evans. Suffruticose, erect. Stems many from a woody root, copiously branching; leaves scattered, petiolate, lanceolate, acute, entire, margins reflexed, glabrous. Peduncles axillary, solitary 3–1-flowered by abortion, the 1-flowered peduncles with a pair of bracts above the middle, the 3-flowered peduncles with smaller bracts, the lateral flowers only having a pair of bracteoles below the calyx, the central flower without bracteoles. Bracts linear, equalling the pedicels, bracteoles smaller. Calyx 8-costate, 4-toothed. Petals 4, ovate. Stamens 4, exserted. Flowers pink.

The plant 15–18 inches high. Leaves ¼ inch long, less than 1 line wide. Calyx 1 line long, petals equalling calyx.

Habitat: Natal; province of Zululand near Tugela River, *J. Wylie* (*Wood*, No. 5689).

This plant differs from *L. sagittæfolium* Sond., which also has four stamens, by form, size, and indument of leaves, and also in inflorescence; and from *L. hyssopifolium* in size and position of leaves, mode of inflorescence, and number of stamens. [p. 12.]

MR. CHARLES HOSE'S BORNEAN MONOCOTYLEDONS.

By A. B. Rendle, M.A., D.Sc.

The following is a list of the Monocotyledons contained in collections made by Mr. Charles Hose in the Baram district of Sarawak in the years 1894–95; including also a few collected in the Minahasa district of North Celebes. The plants are in the National Herbarium.

Burmannia cœlestis Don.
Baram, Nov. 1, 1894; no. 353.

Oberonia iridifolia Lindl.
Baram, Nov. 10, 1894; no. 151.
Not hitherto recorded from Borneo, though known from India, the Philippine Islands (*Cuming*, nos. 2120, 2137), and Australia.

Oberonia Hosei, sp. nov. Herba breviter caulescens, foliis distichis brevibus ensiformibus subacutis; scapo bracteato, cum racemo gracili folia duplo excedente; floribus minimis, spiraliter ordinatis, haud densis; bracteis oblongo-lanceolatis acuminatis, margine erosis, pedicellum cum ovario paullo superantibus; sepalis late ellipticis obtusis integris, siccis reflexis; petalis ovatis, sepala subæquantibus, margine erosis; labello aurantiaco concavo 3-nervio, e basi auriculata superne paullo angustato, apice bifido, lobis acutis.

Plant 12 cm. high, with a short erect stem barely 2·5 cm. long bearing 8 distichously arranged leaves, the largest 4·5 cm. long by ·5 cm. broad. Scape sheathed at the base by the uppermost leaf, bearing only small membranous acute bracts in the lower part (2·5 cm.), fertile portion 7 cm. long; the minute orange-coloured flowers aggregated in groups of threes, becoming solitary above. Bracts 1·25 mm. long; flowers subsessile, pedicel and ovary together 1 mm. long; flower when spread open 2 mm. across. Sepals ·75 mm. long. Lip 1 mm. long by ·75 mm. broad at the base, apparently a deeper orange than the rest of the flower, narrowing slightly from below upwards, bifid at the apex for about one-third of its length, with an obsolete lobule between the triangular segments.

Is perhaps nearest the Sikkim species *O. auriculata* King & Pantling, from which it differs in its orange flowers, more densely arranged on the raceme, with broader petals, and especially in the lip, which is broader at the base and less deeply cleft.
Baram, Nov. 10, 1894; no. 30.

Liparis flaccida Reichenb. f.
Baram district, Entoyut river, Nov. 13, 1894; no. 459.

Platyclinis brevilabrata, sp. nov. Planta minor rhizomate subrobusto; pseudobulbis fusiformibus flavis, siccis corrugatis; folio lineari-lanceolato obtuso, breviter petiolato; scapo tenui, folium superante, e basi vaginata florifero; racemo multifloro, floribus parvis; bracteis latis truncatis pedicellos breves subæquantibus; sepalis obtusis, subæqualibus, dorsali oblongo-subspathulato; lateralibus oblongo-lanceolatis; petalis linearibus, inferne paullo

angustatis, quam sepala minoribus; labello, petalis duplo minore, obtuso, rhomboideo-spathulato, disco depresso, lobis lateralibus obsoletis; columnæ brachiis elongatis, acuminatis, clinandrio postice valde evoluto, trapezoideo, cum denticulo minuto laterali et superne in dentes parvos aristuliformes producto; anthera hemisphærica.

Strong woody rhizome about 3 mm. thick, the short internodes enveloped by scarious ovate light brown scales. Pseudobulbs 1·6–3 cm. long by ·5 cm. or less in thickness. Leaf 4–7 cm. long, including a short petiole of 2–4 mm., 8–14 mm. broad, multinerved, 5 veins standing out more prominently than the rest on the dorsal surface. Scape 10–11 cm. long, bracts 1·5–2 mm. long, pedicel with ovary 2–3 mm. long. Sepals 5·5–6 mm. long, the lateral barely shorter than the dorsal; petals 4·5–5 mm. long, narrower than the sepals; lip 2 mm. long by 1·25 mm. broad below the apex; column including clinandrium 2·5 mm. long.

A very distinct little species, characterized by its short blunt leaves, and small trapezoid-spathulate lip with obsolete lateral lobes.

Baram, Oct. 25, 1894; no. 52.

Dendrobium (§ *Aporum*) *Serra* Lindl.? No flowers present.

Baram, Nov. 8, 1894; no. 153 in part.

D. (§ *Virgatæ*) *conostàlix* Reichenb. f.

Baram, Nov. 1894; no. 148.

Not hitherto recorded from Borneo, though a wide-spread Malayan plant (Malacca, Singapore, Java, Philippines).

D. (§ *Bambusifoliæ*) *gemellum* Lindl.

Baram district, Miri river, Feb. 1895; no. 511.

A wide-spread Malayan plant, not previously recorded from Borneo.

Bulbophyllum clandestinum Lindl.

Baram, Nov. 23, 1894; no. 152.

B. elatius Ridl.

Baram, Dec. 1894; no. 234.

The flowers in Mr. Hose's specimens differ from those on which the species was founded (see Journ. Linn. Soc. xxxi. 275) in their more acute sepals. Is the species distinct from the little-known *B. odoratum* Lindl.?

Eria (§ *Hymeneria*) **Hosei,** sp. nov. Planta caule crasso, vaginis pallide bruneis tecto; foliis in specimine 5, ad apicem caulis congestis, oblongo-lanceolatis, acutis, 9–11-nerviis; racemis axillaribus, quam folia duplo brevioribus, multifloris; bracteis sæpe ellipsoideis, reflexis; floribus inter mediocres, longius pedicellatis, pedicellis gracilibus, veluti rhachi puberulis; sepalis subæquilongis, acutis, lateralibus ovato-rhomboideis, basi secundum columnæ pedem longum extensis; petalis angustis, sepalum dorsale ovatum ut apparet longitudine æquantibus; labello cum basi trapezoideo, lobis lateralibus oblongis ascendentibus, lobo medio multo majore, rotunde ellipsoideo, obtuso.

Stem 1·5 cm. thick; leaves 14–20 cm. long by 3·5–4 cm. broad, thinly coriaceous when dry, stalk broad, about 1 cm. long. Racemes about 10 cm. long, bracts about 1 cm. long; pedicel with ovary 1–1·5 cm. long. The large lateral sepals are 7 mm. long by 3·5 mm. broad in the middle, the base extended forwards along the column-foot (7 mm. long) forms a blunt spur around the concave lip-base. Lower portion of lip 5 mm. long, broadening slightly upwards, and barely 3 mm. wide at the top; lateral lobes 2·5 mm. long by 1·5 mm. broad, mid-lobe 4 by 3·5 mm., the broad apex somewhat crenulate; column 4 mm. long.

A very distinct species of the habit of *E. floribunda*, but easily distinguished by its less dense larger-flowered racemes.

Grammatophyllum speciosum Bl.

Baram district, Apoh river, Nov. 20, 1894; no. 122.

Cymbidium Finlaysonianum Lindl.

Baram district, Miri river, Jan. 1895; no. 565.

A widely spread Malayan plant not hitherto recorded from Borneo.

Mr. Hose's plant closely resembles specimens sent from Pahang by Ridley, and also the no. 679 of Zollinger's Java collection and no. 2082 of Cuming's Philippine plants. Cuming's no. 2121 is also conspecific, but the large, almost orbicular mid-lobe of the lip has a markedly emarginate apex.

A specimen from Christian Smith, labelled "Barn Island, Straits Sincapore, July 4, 1796," has narrower sepals 13–14 lines long and barely 2 lines broad, and a narrower median lip-lobe.

Dipodium paludosum Reichenb. f.

Baram, March, 1895; no. 45.

The plant shows some differences from the specimens from the Malayan Peninsula and Labuan and the cultivated specimens (see Bot. Mag. t. 7464) in the Kew Herbarium. The flowers are larger, the longer oblanceolate petals are obviously larger than the lateral sepals (*e.g.* petals 2·7 cm. long by 6 mm. broad, sepals 2·2 cm. by 4·5 mm.), while the lip is still shorter (1·6–1·8 cm.). The base of the lip is also longer, and the lateral teeth are more conspicuous. The perianth-leaves show no trace of spotting in the dried specimen. Assuming the specimens to be conspecific, the species evidently shows considerable variation. Thus we have at the Museum another Borneo specimen (near Patong, *Grabowsky*, 1881) in which the sepals and petals more resemble the smaller-flowered form; they are shorter than in Mr. Hose's plant, subequal (and obviously spotted); the lip-base below the lateral teeth is, as in the smaller flowers, very short, but the lateral teeth are much longer than in the Hose specimen, being 6 mm. long by 1 mm. broad; the pedicels of the pollinia are also conspicuously longer than in both the others (2 mm. long, only 1·5 mm. in the Hose specimen), and the ellipsoid upper lip-lobe is densely tomentose from apex to base. The leaves are also stouter, broader, and less tapering. Grabowsky describes the flowers as yellowish white spotted with brown; in size and form they resemble those of

D. pictum, where also the lip has similar lateral teeth, but a much broader upper lobe, hairy only at the apex.

Vanda Hookeriana Reichenb. f.

Baram, April, 1895; no. 366.

Cryptostylis Arachnites Bl.

Baram, Nov. 8, 1894; no. 31.

Saccolabium perpusillum Hook. f.

Baram district, Redan, Nov. 3, 1894; no. 33.

A native of Singapore not previously recorded from Borneo.

Appendicula bifaria Lindl.?

Baram, Nov. 8, 1894; no. 153 in part.

Only a single flower, which resembles *A. bifaria*, but has a longer lip.

A. ANCEPS Bl. (*A. complanata* Ridley in Journ. Linn. Soc. xxxii. 389).

Baram, Nov. 13, 1894; no. 149.

Malayan Peninsula, Singapore and Java, but not previously recorded from Borneo.

I have followed Schlechter (see Mém. Herb. Boiss. no. 21, p. 34) in considering the peninsula plants on which Ridley founded his species as conspecific with the Java specimens. The Bornean plants are smaller, about 6 in. high, with leaves 2–3·5 cm. long by 7–8 mm. broad. I can find no difference in the flowers.

Globba affinis, sp. nov. Herba minor perennis erecta, folii vagina angusta, sæpe rubescente, plus minus pilosula, margine superne ciliolata; ligula breviter rotundata ciliolata; lamina subsessili, subasymmetrico-lanceolata, acuminata, in facie superiore pilosula vel glabrescente, in facie inferiore glabra; panicula pedunculata brevi compacta, ramis patentibus plurifloris; bracteis ovatis; calycis limbis triangularibus, subæqualibus; corolla alba, tubo gracili calycem triplo excedente, lobis cymbiformibus, staminodiis his paullo longioribus, elliptico-oblongis; labello spathulato-cuneato, apice latissimo emarginato; staminis filamento anguste lineari, anthera brevi rotundata, utrinque sub medio longe calcarata; bacca sessili, pisiformi, costata, glabra.

Plants from 30 cm. high; leaf-blades 5–14·5 cm. long by 1·3–3·3 cm. broad, sheath barely exceeding 2·5 mm. from back to front. Panicle terminal, 2·5–5 cm. long, peduncle 9 cm. or less, branches spreading or spreading-ascending, 3·5–1 cm. long, the longer ones many-flowered; bracts 2·5–4·5 mm. long. Calyx-tube 3 mm. long, segments 1 mm. Corolla-tube 13 mm. long, lobes 3 mm.; staminodia 4 mm. long; lip 7 mm. long by 4·5 mm. broad just below the apex; filament 13 mm. long; anther 1 mm.; spur acuminate from a triangular base, 2·5 mm. long.

Evidently closely allied to *G. brachyanthera* K. Schum. (in Engl. Jahrb. xxvii. 329), also from Borneo, but distinguished by its pilosulose leaf-sheaths, dense inflorescence, uniformly narrow staminal filament, and anther spurred from the sides, not from the base.

Baram district, Entoyut river, Nov. 1894, no. 456; and Baram, Oct. 25, 1894, no. 109.

Alpinia Fraseriana Oliver.
Baram mouth, Jan. 1895; no. 61.
Endemic.

Clinogyne grandis Baker.
Baram, April 18, 1895; no. 696.

Dioscorea dæmona Roxb.
North Celebes, Minahasa district; no. 801.

D. pyrifolia Kunth.
Baram, Dec. 1894; no. 80.

Smilax leucophylla Bl.
North Celebes, Minahasa district; no. 823.

S. odoratissima Bl.
Baram district, Mt. Skiwa, 1–2000 ft., Dec. 1894; no. 442.

Dracæna graminifolia Wall.
Baram district, Miri river, Jan. 1895; no. 527.

D. angustifolia Roxb.
Baram district, Miri river, Jan. 1895; no. 542.

Dianella ensifolia Red.
Baram, Nov. 1894; no. 150.

Monochoria hastæfolia Presl.
Baram district, Miri river, Feb. 1895; no. 508.

Forrestia marginata Hassk.
Baram district, Entoyut river, Nov. 1894; no. 370.

Flagellaria indica L.
Baram, Dec. 1894, no. 166; Miri, April 28, 1895, no. 609.

Pinanga lepidota, sp. nov. Palma ut apparet elegans, internodiis rubro-punctulatis; frondibus flabellatis, suboblongis, marginibus subparallelis, apice alte bifidis, lobis subtruncatis, grosse dentatis, costulis in utroque latere circa 14 percursis; infra basin attenuatam cum segmento angusto lanceolato acuminato distanti utrinque suffultis; petiolo et rhachi junioribus albido-lepidotis; vagina tubulosa, ore obliqua, tenuiter striata, lepidoto-puberula; spadice simplici, glabro, erecto; fructibus distichis læte bruneis.

The frond consists of a large terminal portion, broadening very slightly upwards, 25–26 cm. long by 10·5 cm. broad just below the apical incision, which is 10–11 cm. deep; the lower small pair of segments are 2–3-ribbed, 12–14 cm. long, and 1·3–1·5 cm. broad; they are subopposite, and situated about 4 cm. below the large segment. In one leaf there is but one lower segment, the large segment being asymmetrical, the larger side on which there is no lower segment containing 18 lateral ribs. Petioles 6·5 cm. long. The hairs on the petiole and rachis of the younger leaves are flat and whitish, with a few narrower red ones interspersed; a slightly raised line between each of the lateral ribs of the leaf-blade is sparsely covered with similar small narrow reddish scale-hairs. On the sheaths the scale-hairs consist of a flat red portion, breaking up at the margin into flexuose whitish hairs. On the young sheaths the marginal hairs are closely packed laterally, forming a scale-like covering; in the older they spread irregularly, giving a puberulous appearance. Spadix 8 cm. long; fruits (scarcely ripe) narrowly ovate, 11–12 mm. long by about 4·5 mm. broad.

Near *P. disticha* Bl., but distinguished by the form of the leaf, the white lepidote rachis, and especially by the *erect* spadix.

Baram, April, 1895; no. 702.

Oncosperma tigillaria Ridl.

Baram district, Miri, April 27, 1895; no. 701.

The specimens include no fruits, but seem to be conspecific with specimens from Singapore sent under this name by Mr. Ridley.

Ceratolobus discolor Becc. (e descript. in Malesia, iii. 63).

Baram, March, 1895; no. 704.

There are also three species of *Calamus* which I have not been able to determine.

Pandanus sp.

Baram, April, 1895; no. 707.

No flowers present.

Amorphophallus campanulatus Bl.

North Celebes, Minahasa district; no. 809.

Pothos (§ *Allopothos*) **Hosei**, sp. nov. Planta forte insignis, foliis magnis robustis, petiolis laminæ dimidium vix æquantibus, ad geniculum usque vaginatis; lamina oblonga ad elliptico-oblonga, basi obtusa, apice abrupte et breviter acuminata, inæquilatera, altero latere circa tertia parte majore, nervis collectivis utrinque duobus basi et supra basin folii nascentibus, margini approximatis; pedunculo singulo in axillo cataphylli oriente; spatha subcoriacea breve ovata obtusa, basi pedunculo decurrente; spadice sessile cylindrico; staminibus tribus externis sterilibus, petala æquantibus; internis brevioribus, fertilibus.

The specimens consist of the upper part of a shoot with one adult leaf, and there is no note as to the size of the plant. The larger leaf has a blade 22 cm. long, the width on the two sides of the midrib being 5 and 6·5 cm. respectively, and a petiole 10·5 cm. long, with a strong somewhat narrow sheath not exceeding 6 mm. from back to edge. Peduncle 2·5 cm. long, subtended by a lanceolate scale-leaf about 2·2 cm. long; spathe 3 cm. long by about 1·5 cm. greatest breadth; spadix 4·5 cm. long by nearly 5 mm. in diameter at the base, densely and regularly flowered; style conical, tapering, about 1 mm. long.

Near *P. Rumphii*, but distinguished by its more oblong leaf with the lateral ascending nerves rising at or just above the base, and its shorter spathe. It also approaches *P. insignis* Engl., but the leaf has an abruptly acuminate apex, and only two marginal nerves, and the inflorescence is smaller in every part.

Baram district, Marudi, April, 1895; no. 582.

Sciaphila major Becc.

Baram, Nov. 24, 1894, no. 178; and Entoyut river, Nov. 12, 1894, no. 427.

Endemic.

Diplacrum caricinum R. Br.
Baram, Nov. 1, 1894; no. 348.
India; Malaya.

Panicum indicum L.
Baram, Nov. 1, 1894; no. 276.

Leptaspis urceolata Br. & Benn.
Baram district, Entoyut river, Nov. 1894; no. 372.

Dinochloa Tjankorreh Büse?
Baram district, Miri river, Jan. 1895; no. 65.

The spikelet clusters are larger and denser than in the type. The spikelets are mostly empty, with expanded lower glumes; a few remain about 3 mm. long, but the stamens are all more or less aborted; the latter differ from those of the type in having filaments nearly as long as the upper portion, which consists of a more or less aborted anther and an acuminate connective.

KENT MOSSES.

By E. M. Holmes, F.L.S.

In 1877 a list of the Mosses of Kent was prepared with the view to its incorporation in the *Flora of Kent*, when published. When that work was recently finished, I was unable to spare the time to bring the cryptogamic flora of the county up to date, but am now able to publish additional species of mosses. I pointed out in 1877 that several more species might be expected to occur in Kent, and the majority of those then indicated have since been detected and many new localities for previously recorded species have been discovered, especially by the Rt. Hon. Lord Justice Stirling, who has most carefully investigated the neighbourhood of Goudhurst, where he resides, and where, as might have been expected from the similarity of the soil to that of the neighbouring districts in Sussex, many species recorded for Sussex, but previously unknown as Kentish, have been discovered, especially on the damp sandy clay, which, except near the neighbourhood of Tunbridge Wells, is not frequent in Kent. Since the publication of the list of Kentish Mosses, Mr. Dixon's excellent *Student's Handbook of British Mosses* has appeared and has come into general use, and Mr. E. C. Horrell has published an account of the *Sphagnaceæ* as revised by Warnstorf. In the following list, therefore, the names given by these two authors will be followed; those in the previous list will be given in parentheses, but for the sake of convenience of reference the order followed will be that of the previous list published in 1877. The initials used indicate the following gentlemen by whom the various species were detected:—

J. S.	The Right Honourable Lord Justice Stirling.
W. E. N.	Mr. W. E. Nicholson, Lewes.
E. S. S.	Mr. E. S. Salmon, Reigate.
E. C. H.	Mr. E. C. Horrell, Peckham.

The Sphagna in this list have been determined by Mr. E. C. Horrell, who has paid special attention to this group. Where the collector's name is not given, the author is responsible for the names.. The species new to the county, added since 1877, are as follows:—

Sphagnum subnitens R. & W. var. *violascens* Warnst. Goudhurst, *J. S.*—*S. cymbifolium* Warnst. var. *versicolor* W. Goudhurst, *J. S.* —Var. *pallescens* W. Keston Common, *E. C. H.*—*S. medium* Limpr. var. *roseum* Warnst. Keston Common, *E. C. H.* — *S. papillosum* Lindb. var. *normale* Warnst. Keston Common, *E. C. H.* — Var. *sublæve* Warnst. Keston Common, *E. C. H.*; Seal, near Sevenoaks. —*S. rubellum* Wils. var. *rubrum* Grav. Keston Common, *Cocks.*— *S. crassicladum* Warnst. Near Ightham, *E. C. H.* — *S. rufescens* Warnst. Keston Common, *Cocks.* — *S. cuspidatum* R. & W. var. *falcatum*. Keston Common, *E. C. H.*

Tetraphis Browniana Grev. (*Tetrodontium*). On stones in a stream in Hungershall Wood, Tunbridge Wells, but on the Kentish side of the river, very sparingly. The place where it grows is being altered by building and sewerage operations, and several rare species of mosses have disappeared since 1877 in this locality.

Catharinea angustata Brid. Bedgebury Wood, near Goudhurst, *W. E. N. & J. S.* Growing in some abundance in damper parts of the wood, it is not easily distinguished at sight from some forms of *C. undulata*, but under a lens it is easily recognized by its wide nerve. A few specimens were found in fruit in December.— *C. tenella* Röhl. In the same wood as, and in company with, the last species, *E. S. S. & J. S.* First found by Mr. Salmon in a barren state, but subsequently in fruit, sparingly. It resembles *C. undulata* in the young state, but the leaves have a more translucent appearance, and are practically free from spines on the surface. The leaves also have a more lanceolate or broader appearance than in *C. angustata*.

Polytrichum strictum Banks. Ginning's Springs, near Westenhanger.

Archidium alternifolium Schimp. On damp sandy clay in a quarry near Goudhurst, abundantly, *E. M. H. & J. S.*

Pleuridium alternifolium Rabenh. Ightham.

Seligeria pusilla B. & S. Morant's Court Hill, near Dunton Green; Kemsing Quarry. This species occurs in the same wood as *S. paucifolia* Carr., but is readily distinguished by the wide-mouthed capsule and the denticulate base of the leaves.

Dicranella crispa Schimp. In a lane between Langton Green and Speldhurst, abundantly, *T. W.* — *D. rufescens* Schimp. Goudhurst, in two places, *W. E. N. & J. S.* — *D. Schreberi* Schimp. Damp wood near Dover; field near Bessell's Green, Sevenoaks. In both places sparingly. — Var. *β elata* Schimp. Gravel-pit, Goudhurst, *W. E. N. & J. S.*

Dichodontium pellucidum Schimp. In a damp lane between Langton Green and Ashurst, and at Hingershall Rocks, *E. M. H.* In two places near Goudhurst, *J. S. & W. E. N.*

Weissia multicapsularis Mitt. (*Systegium*). Field near Bessell's Green, Sevenoaks, sparingly. — *W. crispa* var. *β aciculata* Mitt.

In some abundance in a grassy field near Ightham. This variety has been distributed by me as *Weissia multicapsularis*, and has been accepted as such by several bryologists. It differs very much in habit from *W. crispa* Mitt., growing in somewhat loose spreading patches amongst grass, and almost hidden by it; the uppermost leaves are longer; the plant is duller in colour, and less crisped when dry. In areolation of the leaf, however, it more nearly approaches *W. crispa*, and fruits more freely than typical *W. multicapsularis*. Mr. W. E. Nicholson, who has carefully examined the plant, is of opinion that it is referable to the above variety.— *W. microstoma* C. M. Seal, near Sevenoaks. This species appears to be by no means common in Kent. — *W. squarrosa* C. M. Near Stone Street, Sevenoaks, and near Bessell's Green. Goudhurst, *J. S.* This species grows usually in much damper situations than *W. viridula*, and when the lid has fallen is easily recognized by the membrane closing the mouth of the capsule; and also by the plane margins of the leaves.— *W. tenuis* C. M. Fant Woods, Maidstone, in fruit abundantly; and White Rock, near Stone Street, sterile. Goudhurst, on an old bridge, *J. S.* This species seems to prefer shady greensand rocks or stones.

Leptodontium gemmascens Braithw. On a barn near Riverhead. The thatch on the barn has since been renewed, and the plant has disappeared.

Phascum Flœrkeanum W. & M. On clods of chalk in open fields, in September and October, Morant's Court Hill. Recognized by its reddish tint and by growing in a scattered manner, preferring the shady side of clods of chalk turned up by the plough. On the level soil it is quickly hidden from sight by the action of the rain.

Pottia bryoides Mitt. On a grassy slope near Shoreham, very sparingly.

Barbula spadicea Mitt. In one place near Goudhurst, *W. E. N.*

Trichostomum tortuosum Dixon. Between Shoreham and Eynesford, on the side of a chalk cutting, *H. W. Monington.* I have not seen a specimen, but it is said to occur in similar localities in Surrey.

Grimmia commutata Hüben. On a tiled roof near Goudhurst, very rare, *W. E. N. & J. S.* — *G. pulvinata* Smith, var. *β obtusa* Hüben. On a wall, Knowle Park, Sevenoaks. — *G. orbicularis* Bruch. A single tuft on a wall in Seal Hollow Lane, Sevenoaks. Easily recognized by the dimidiate calyptra, and by the fruit being more developed in February than that of *G. pulvinata.*

Rhacomitrium lanuginosum Brid. Three tufts only on a tiled shed, Bedgebury, near Goudhurst, *W. E. N. & J. S.*

Zygodon viridissimus Brown, var. *β rupestris* Lindb. In fruit near Bessell's Green.

Ephemerum serratum Hampe, *β angustifolium* B. & S. In fruit abundantly in a grassy field near Ightham, in company with *Weissia crispa* var. *aciculata* Mitt. and *Funaria fascicularis* Schimp.; Goudhurst, *W. E. N. & J. S.* — *E. sessile* Rabenh. Bedgebury Wood, near Goudhurst, *W. E. N. & J. S.*

Funaria ericetorum Dixon. Goudhurst, in several places, *J. S.*

Joyden's Wood, near Bexley.—*F. fascicularis* Dixon. Frequent on stony grassy fields on the lower greensand. Goudhurst, in several places, *J. S.* Near Ightham, abundantly; near Ide Hill, Cudham.

Bryum pseudotriquetrum Schwaegr. Keston Common, *E. George.* Ightham, *E. M. H.* Goudhurst, not uncommon, *J. S.*

Philonotis capillaris Lindb. Godden Green, near Sevenoaks, *E. M. H. & Mrs. Holmes.* Bedgebury Wood, Goudhurst, sparingly, with male flowers, *W. E. N. & J. S.*

Fissidens viridulus Wahlenb. Forest Hill, *E. George.* Sevenoaks, *E. M. H.* Goudhurst, in two places, *J. S.* — *F. decipiens* De Not. Godden Green, Sevenoaks. Found only in a sterile condition. — *F. collinus* Mitt. Kemsing. This plant, which grows amongst grass on chalky hill-sides, is regarded by Dixon as only a form of *F. adiantoides* Hedw.

Eurhynchium striatulum B. & S. Basted Hill, near Borough Green and Plaxtol, rare and sterile. — *E. abbreviatum* Schimp. Plaxtol, *E. M. H.* Goudhurst, in three places, *E. S. S. & J. S.*

Plagiothecium Borrerianum Spruce. Rusthall, Tunbridge Wells, in fruit, *J. S.* The fruit is very rare.

Amblystegium protensum Lindb. Woods near Stone Street, Sevenoaks. This plant is placed by Dixon under *Hypnum stellatum* as var. *β protensum* B. & S. It is, however, very distinct in habit from that moss. It was growing prostrate on boulders of greensand rock in a wooded valley, and grew closely adherent to the stone.

NOTES ON SHROPSHIRE PLANTS.

By William E. Beckwith.

[The following list is evidently a continuation of the notes by the late Mr. W. E. Beckwith which appeared in this Journal for 1881 and 1882, and carries his records down to the year 1889. The manuscript was kindly lent by Miss Beckwith for the use of the Committee now engaged in the preliminary work of the proposed new Flora of Shropshire, and has been copied by Mr. R. de G. Benson.—W. P. Hamilton, *Hon. Sec. to the Committee.*]

Ranunculus Lingua L. By Blackmere and Osmere Meres, near Whitchurch; by a pool near Baschurch Railway-station; in a small pool between Hufley and Perril, near Shrewsbury, but which is evidently the last remains of an extensive piece of water; by Marton Pool, near Chirbury; ditches on Baggy Moor, near Bagley. Rare, except by large, or what have been large, pieces of water, or in wide open ditches. — *R. parviflorus* L. Bridge over Great Western Railway west of Baschurch Station. A rare plant in Shropshire. — *R. arvensis* L. Ploughed fields on the outskirts of Wyre Forest; also near Cressage, Harley, Westbury, Cruckton, and Baschurch. Not common, but often imported with seed-corn.

Trollius europæus L. Ditches at the Hayes near Oswestry, and in grass-fields near Welsh Frankton. In both places it may have escaped from gardens.

Aquilegia vulgaris L. Plentiful on the steep right bank of the Mole brook below the village of Leighton, but the varied colours of the flowers betray its garden origin.

Aconitum Napellus L. Plentiful by the river Ledwytch, in the neighbourhood of Poughmill and Caynham, near Ludlow.

Berberis vulgaris L. Hedges about the Sharpstones Hill and Monkmoor; by the river Perry near Baschurch; by Westbury Railway-station; Shawbury (*Miss Kilvert*).

Nymphæa alba L. Pools on Shawbury Heath; Osmere Mere; abundant in Sundorne Pool.

Nuphar lutea Sm. Osmere Mere; river Perry, above Baschurch.

Papaver Argemone L. Ploughed fields and hedgebanks near Buildwas Abbey, Baschurch, and Croesmere.

Corydalis claviculata DC. On Grinshill Hill and Pim Hill; in a bog near Welshampton; in a wood near Colemere Mere.

Brassica nigra Koch. By the Severn at Cressage, and near Dawley Church.

Cardamine amara L. By the Worfe, from Rindleford to its mouth; bogs near Arkoll and Lawrence Hill; by the Severn near Shelton, Uffington, Eaton Constantine, Cressage and Leighton, and in wet places in woods in Leighton parish; boggy field by the road from Cressage to Cressage Park; by river Perry near Baschurch; brook at Harnage; Manor Pool, Shifnal; Snow Pool, Dryton; by the river Roden below Lee Bridge. — *C. impatiens* L. Helmuth, and woods above Watling Street, between Church and Little Stretton; plentiful.

Arabis perfoliata Lam. Lane near Moreton Corbet. Mr. W. Beacall has found it in hedges at the Cliff, and Marton, near Baschurch.

Barbarea stricta Andrz. Mr. J. G. Baker considers specimens from by the stream flowing from Cross Houses to the Severn, and from by the mill on the Roden at Newton-on-Hine-Heath, to belong to this species.

Cochlearia danica L. Old roofs near the Smithfield, Shrewsbury.

Thlaspi arvense L. Neaves Castle, Garmeston and Lye Farm in Leighton parish; Cound village; plentiful by Lady Oak near Cressage and Belswardine Hall; Fox Farm; Chilton.

Teesdalia nudicaulis Br. Bank above Snow Pool near Dryton; hedge by Hampton Bank near Ellesmere.

Lepidium Smithii Hook. Grinshill Hill; Mary's Dingle, near Leighton; by a chapel on Overley Hill; lane near Moreton Corbet; frequent on the Sharpstones Hill, near Shrewsbury; rather common about Church Stretton.

Coronopus Ruellii Gaertn. On the roads on Kingsland Shrewsbury, and about Albright Lee, Cross Hill, Harlescott and Betton near that town; lane below Eye Farm and by Leighton Hall, Leighton; below Eaton Constantine Rectory; bridle road from Donnington to Beslow, near Wroxeter. — *C. didymus* Sm. Left bank of Severn opposite Cherry Orchard; sent me in 1889 by Mr.

H. Royle. (Mr. Beacall records this from same neighbourhood in May, 1880.)

Reseda Luteola L. Wenlock and Haughmond Abbeys; by Severn, above Cressage and near Buildwas; limekilns in Farley Dingle and Iron Bridge; near Madeley and Coalport; near Cound, Caynham Court, Longville, Eaton Mascott, Battlefield, Harley, and Oswestry; abundant around Oakengates on old pit-mounds.

Helianthemum vulgare Gaertn. Sent me by Mr. W. Beacall from Haughmond Hill.

Viola palustris L. Blackmere Mere, near Ellesmere; boggy field near Hampton Bank; Shawbury Park Wood. — *V. hirta* L. By roadsides and in wood in Farley Dingle and near Tickwood.— *V. lutea* Huds. On the Longmynds and Caradoc, near Church Stretton.

Drosera rotundifolia L. Wet places at Hampton Bank and Moss by Swetmere, near Ellesmere; plentiful in small bogs at the base of the Caradoc; by pools on Hodnet Heath. — *D. anglica* Huds. Boggy ground at Hampton Bank, on Whixall Moss.

Silene inflata Sm. Hedgebanks at Grindle, near Shifnal; abundant on Wenlock Edge, Harley, Cressage, Charlton Hill, Betton, West Felton, Baschurch, Grinshill, Oswestry, Ellesmere, Cockshutt, Marton near Chirbury.

Lychnis Githago Lam. Plentiful in cornfields near Shifnal; also found about Shrewsbury, Wroxeter, Eaton Constantine, Leighton, and Acton Burnell. Not common, but often imported with clover-seed.

Cerastium quaternellum Fenzl. Upon Charlton and Broomhill and near Snow Pool, Wroxeter. Mr. H. Auden has also collected it on Pontesford Hill. — *C. semidecandrum* L. High Rock, Bridgnorth; by foot-road to Rindleford.

Stellaria aquatica Scop. By the Severn, near Cressage, Leighton, and Bridgnorth; in its old bed near Salop; Walford Pool; by brooks and ditches about Minsterley, Bomere Farm, and abundant near Betton Pool; by the old bed of the Tern, at its mouth; by brook at Hanwood; Shelton Rough;. Baggy Moor; Rodington; Kinnersley; Attingham Park; by the brook at Yockleton, and river Perry at Baschurch; Stanwardine-in-the-fields. — *S. media* With. A large form of this, which Mr. A. Bennett considers to be *neglecta*, grows in a wood at Pimley, near Uffington, and under the High Rock, Bridgnorth.

Sagina nodosa E. Mey. Frequent about canal wharf near Rednal Station, and by the canal at Weston Lullingfields.

Spergularia rubra Fenzl. Common about Bridgnorth; Snow Pool, Wroxeter; Shawbury Heath; Cliff Hill, near Nesscliffe; by railway near Hodnet; bottom of Carding Mill Valley, Church Stretton.

Montia fontana L. Plentiful in ditches and wet places; by Bomere Pool, Osmere Mere, and Newton Mere; abundant by small streams and in wet places on the Longmynds.

Elatine hexandra DC. Plentiful in Newton Mere, near Ellesmere.

Hypericum Androsæmum L. Hedges near Cressage Park; in

Willey Park; wood by railway below Shineton; Hurst Wood, Leighton.—*H. humifusum* L. Charlton Hill, plentiful; Grinshill; Hawkstone; round Whixall Moss. and about Wyre Forest; round Church Stretton, plentiful. — *H. montanum* L. Lane near Easthope, on Wenlock Edge. Very rare. — *H. hirsutum* L. About Leighton, Cressage Park, Harley, Cound, Hook-a-Gate, Redhill, Condover; near Bridgnorth, Linley, Hughley, Eaton Constantine; plentiful about Little Wenlock; Coalport and Longville. — *H. Elodes* L. By Oxon Pool, Shrawardine Pool, Snow Pool, at Berrington, and on Shawbury Heath.

Malva moschata L. Cressage, Cound, Berrington, Bomere Pool, Longville, Stokesay, Minsterley, Eaton Constantine, Arkoll Hill, and Charlton Hill; about Whitchurch, Much Wenlock, and Sharpstones Hill, plentiful; near Walk Mill, All-Stretton.

Geranium pratense L. By the Severn at Quatford, Hughley, and near Dowles; by the river Roden at Stanton-on-Hine-Heath, and Shawbury; by brook which flows into the Severn by Linley Railway-station. — *G. pyrenaicum* L. By the chapel at Eaton Mascott; by road between Cound and Cross Houses; on the Hermitage Hill, Bridgnorth, and by the Weir Coppice, Hanwood, and near Oxon. — *G. pusillum* L. Charlton Hill and by Snow Pool, Wroxeter. — *G. columbinum* L. About Much Wenlock, Munslow, Kemberton, Harley; by Severn above Cressage; Presthope.—*G. lucidum* L. Longnor and Dorrington, *R. M. Serjeantson.* Hermitage Hill; Hanwood; Bromfield; Ludlow Castle. — *G. sylvaticum* L. Many places in Wyre Forest, but nowhere plentiful.

Erodium cicutarium L'Hérit. Norton, near Wroxeter; Cound Arbour and Cound Stank; Dryton; Cliff Hill, Baschurch; Charlton Hill.

Euonymus europæus L. Woods about Buildwas and up Farley Dingle; Acton Burnell; Shawbury, by the Roden; Charlton Hill; Cause Castle; Baschurch; Minsterley; Lee Bridge; Eaton Mascott; Cound Moor; Cressage; Apley Park; High Rock; Preston Boats; Sharpstones Hill; Red Hill; Hanwood; Nobold; Oakley Park; Poughmill; Yockleton; Cross Hill; Plealey; Shrawardine; Easthope.

Rhamnus catharticus L. Woods by the line east of Baschurch Railway-station; about the "Yestalls," plentiful.—*R. Frangula* L. Baggy Moor, by Limpit Hill; one bush ("in fruit," *W. Beacall*); Wyre Forest, plentiful; hedges near Rednal Station and by Croesmere Mere.

Ulex nanus Forst. Shelve; thought to be so by authorities at Kew, but requires further investigation.

Genista anglica L. Shawbury Heath; small bog by Sharpstones Hill.—*G. tinctoria* L. About Sundorne; Much Wenlock; Eaton Constantine; Golding; Battlefield; abundant near Longville, Kenley, Hughley, and Easthope.

Ononis spinosa L. Hadnal Ease; Under Wenlock Edge; near Harley; by Leighton Hall.

Melilotus arvensis Wallr. Sides of railway by Buildwas; on Kingsland; in clover-fields at Dorrington; Wroxeter.

Anthyllis Vulneraria L. Wenlock Edge, near Presthope.

Trifolium striatum L. Ranslett (?) Dingle, right bank of brook. —*T. hybridum* L. Red Hill; Eaton Constantine, sown with clover and rye-grass. — *T. arvense* L. Rock-hole at Rushton; Grinshill; Shawbury; rock-hole by Baschurch; near Hodnet. ("Hodnet Heath," *Beacall.*)

Astragalus glycyphyllus L. Rindleford Bridge, below the mill; back of Birch Pool.

Ornithopus perpusillus L. Hawkstone Park; Nesscliffe; Grinshill; The Cliff; Sharpstones; abundant on Longmynds.

Vicia tetrasperma Moench. Hawkstone Park, and about Weston, Cound, Cressage, Upton Magna, and Ludlow. — *V. sylvatica* L. Wood by railway below Shineton; woods east of railway between Church and Little Stretton.

Lathyrus latifolius L. Rock-hole by railway west of Baschurch Station.—*L. sylvestris* L. Shelton Rough.—*L. macrorrhiza* Wimm. Welshampton; Farley Dingle, plentiful.

Prunus insititia L. By Severn above Cressage; Beslow; Eaton Constantine Glebe.—*P. avium* L. Sharpstones Hill; Oteley Park; near Wem; Betton Wood; Upper Mill, Leighton; near Westbury; Linley; Henged, near Oswestry; by Grove, Leighton, and near Buildwas Church. — *P. Padus* L. Moreton Corbet; Shawbury; hedges near Prees; by the Perry about Baschurch; plentiful about Henged, Whittington, and Halston.

Spiræa salicifolia L. By roadside near Nesscliffe (Leighton's *Flora*). No claim to be wild, as the late Miss L. H. Jenkins planted it there. — *S. Filipendula* L. Bushy rough ground by Olympian field, Much Wenlock.

Sanguisorba officinalis L. Meadows by small brook above Cruckton Hall.

Poterium Sanguisorba L. Farley Dingle; Tickwood; Buildwas; plentiful on Wenlock Edge.

Alchemilla vulgaris L. Stokesay; Much Wenlock; Little Wenlock; West Frankton, plentiful; Arkoll; Charlton and Newton Hills; Cantlop Mill; Farley Dingle; Church Stretton; Oswestry; Baschurch; Oakley Park; Leighton; Shawbury Park.

Potentilla argentea L. Haughmond Hill, by Downton; Sharpstones Hill.—*P. Comarum* Nestl. Whixall Moss; Grinshill; Shawbury Heath; Osmere Mere; Oxon Pool; Shrawardine Pool, abundant; Weeping Cross Bog; Longville; Hufley; Marton Pool, by Chirbury.

Geum rivale L. Brook below Lumhole Pool; foot of Charlton Hill; by Roden at Newton, plentiful; Perry, above Milford; old bed of Severn at Halston, plentiful; Wilfield; Shawbury; Shawbury Park, plentiful; Holdgate (*Mr. Beacall*). — *G. intermedium.* In several places by streams about Halston, near Whittington.

Pyrus torminalis Ehrh. Farley Dingle, Tickwood Hall, Blackfirs (?); one large tree, dingle below Neaves Castle.—*P. Aucuparia* Gaertn. Woods above Buildwas, and in Farley Dingle; hills and bogs.

[The MS. ends here.]

SHORT NOTES.

Impatiens Roylei. — Last year we found this plant growing in thousands and in the greatest luxuriance along some two miles of the uppermost course of the East Looe River (there only from four to eight feet in width), between Coombe Gate and Moorswater, Cornwall. I notice that it has been called "a cumbersome and weedy thing;" but, growing in the soft warm south-west, with the base of its stem in the clear running stream, it is a magnificent plant, 5–7 ft. or more in height, stalwart, with a stem from 1 to 1¼ in. in diameter just above the surface of the water, erect, symmetrical in shape, with numerous aggregations of blossom, the central mass as big as a man's head, and those terminating all the principal lateral branches, though smaller still most striking—masses of bloom varying on different plants through a dozen lovely shades of colour from the very palest pink imaginable to the deepest claret-colour, and with a profusion of large, elegant, dark green, lanceolate leaves, some of them fully 15 in. in length. Stunted specimens of this Balsam are common in Cornwall in orchards and cottage gardens; but in the Upper Looe River the plant has become thoroughly naturalized, and I have never seen it quite as fine even in its native habitats.—A. O. Hume.

Lonicera Xylosteum in Kent.—At the end of May last I saw a large bush of *Lonicera Xylosteum* on a hedge-bank in a lane not far from Keston Church, Kent, The *Flora of Kent* does not mention the species as occurring in the county.—W. H. Griffin.

Camptothecium nitens in Worcestershire. — My esteemed co-worker in the moss-flora of Worcestershire, Mr. E. Cleminshaw, M.A., has recently found this rare moss in a marshy spot in the Clent district, where I have since had the pleasure of seeing it. This is a somewhat unexpected moss for the midlands.—J. E. Bagnall.

Leptodontium recurvifolium in Ireland.—This fine moss, which was first found by Dr. Taylor in 1842 on Knockavohila, a mountain between Kenmare and Killarney, in Co. Kerry, is stated by Dr. Braithwaite and Mr. Dixon to be extinct in the locality. It is therefore interesting to mention that it was rediscovered by the Rev. C. H. Binstead in 1896 at Connor Hill Pass and on Brandon Mountain, both in Co. Kerry; and by myself in 1898 at Coomanard Loughs, which are situated in a remote and wild deep glen two miles north-east of Connor Hill Pass.—H. W. Lett.

*ARTICLES IN JOURNALS.**

Annals of Botany (March). — A. G. Tansley & E. Chick, 'Conducting Tissue-System in Bryophyta' (2 pl.). — E. A. N. Arber, 'Effect of Salts on assimilation of carbon dioxide in *Ulva latissima*.' —D. T. Gwynne-Vaughan, 'Anatomy of *Loxsoma*' (1 pl.). — W. Watson, 'Germination of seeds of *Bertholettia*' (2 pl.). — D. H. Campbell, 'Embryo-sac of *Peperomia*' (1 pl.). — R. H. Biffen, 'Biology of *Bulgaria polymorpha*' (1 pl.). — E. C. Jeffrey, 'Infranodal organs in Calamites and Dicotyledons' (2 pl.).—B. M. Davis, 'Nuclear studies on *Pellia*' (2 pl.). — I. H. Burkill, 'Ovary of *Parnassia palustris*.'

Bot. Gazette (16 March; received 10 April). — H. C. Cowles, 'Physiographic Ecology of Chicago' (concl.). — M. L. Fernald, 'Nomenclatorial Principles.' — J. W. Harshberger, 'Feeding plasmodia of *Fuligo*.'

Bot. Notiser (häft 2; 1 April).—T. Hedlund, 'Om *Ribes rubrum*.' —R. Sernander, 'Om de buskartade lafvarnes Lapterer.'—L. P. R. Matsson, *Rosa caryophyllacea*.

Bull. de l'Herb. Boissier (31 March).—C. de Candolle. 'Piperaceæ et Meliaceæ brasilienses a cl. W. Schwacke lectæ.' — O. & B. Fedtschenko, 'Flore de la Crimée' (cont.).—R. Chodat, 'Plantæ Hasslerianæ' (Paraguay).

Bull. Torrey Bot. Club (27 March).—A. Eastwood, 'Nemophilas from Pacific Coast' (6 pl.). — M. A. Howe, '*Riccia Beyrichiana* & *R. dictyospora*.'—E. P. Bicknell, '*Teucrium* in E. United States.'— P. A. Rydberg, '*Potentilleæ*.'

Gardeners' Chronicle (30 March). — C. T. Druery, 'Fern phenomena discovered in 19th century.'

Journal de Botanique ("Novembre 1900"; received 30 March). —C. Sauvageau, 'Les Sphacelariacées' (cont.). — A. de Coincy, 'Espèces critiques du genre *Echium*' (concl.). — Ph. van Tieghem, 'Sur les Dicotylédones du groupe des Homoxylées' (cont.).

Journ. Linn. Soc. (Bot.) xxxv. no. 242 (1 April).—A. L. Smith, 'Fungi from West Indies' (3 pl.).—I. H. Burkill, 'Flora of Vavau.' —G. C. Druce, 'British species of Sea-Thrifts and Sea-Lavenders.'

Oesterr. Bot. Zeitschrift (April).—F. Pax, 'Neue Pflanzenformen aus den Karpathen.' — A. V. Schiffner, 'Zur Flora von Madeira, Teneriffa, und Grand-Canaria' (*Hepaticæ*). — A. Waisbecker. 'Zur Flora des Eisenburger Comitats.' — H. Freilach, 'Anatomie des Blattes von *Sanseviera*.'

Rhodora (April). — M. A. Day, 'Herbaria of New England.'— C. S. Sargent, '*Cratægus* from Montreal.' — G. P. Clinton, 'New Smuts on *Eriocaulon*.'—E. L. Greene, *Eupatorium boreale*, sp. n.

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on April 4th, 1901, Mr. W. B. Hemsley exhibited specimens of *Sapium* and *Hevea* and *Castilloa*, with a view to clear up certain questions concerning the Rubber-trees, by examining a large series of plants and seeds forwarded by Mr. Jenman, Government Botanist in British Guiana. The genus *Hevea* included ten or a dozen described species inhabiting eastern tropical South America, but none in the West Indies. *Hevea brasiliensis*, the source of the true Pará rubber, is not very different from *Hevea guianensis*, which is restricted to French Guiana, the differences between them being shown in the figures given of the floral structure and seeds in Hooker's *Icones Plantarum*, plates 2570–2577. It was formerly supposed that two species of *Hevea* might be distinguished in British Guiana, one (*Hevea pauciflora*) having thin leaves and a hairy ovary, the other thick coriaceous leaves and a glabrous ovary; but, after examining a large number of specimens, Mr. Hemsley had come to the conclusion that the differences were not constant, and that all the specimens exhibited might belong to one species, and merely represented individual variation. The exhibition demonstrated the difficulty of determining species of *Hevea* from imperfect specimens, and especially from seeds alone. A paper was read by Messrs. W. B. Hemsley and H. H. Pearson, "On a Small Collection of Dried Plants made by Sir Martin Conway in the Bolivian Andes in 1898–99." This collection contained but forty-six species, but these were of special interest from the great height at which they were found, *i.e.* between 18,000 ft. and 18,700 ft. above sea-level. The highest Andine plants on record were stated to be *Malvastrum flabellatum* Wedd., and a grass, *Deyeuxia glacialis* Wedd.

Dr. E. L. Greene publishes, in the *Catholic University Bulletin* of Washington for April, a severe criticism of "Some Literary Aspects of American Botany." "It would be extreme to say that, from the literary point of view, the condition of American botany has been retrograding somewhat rapidly for ten or a dozen years past, and is in a state which I am sure the forefathers of our Science in this country, the good men of sixty and of thirty years ago, would think of as deplorable; and they would be right." Dr. Greene, we think, weakens his case by the strength of his language, and by a certain vein of hypercriticism which pervades his paper; but he has written an interesting essay (to be followed, we gather, by others on the same subject), to which we may take occasion to recur.

We have received a circular with reference to the formation of a new society, to be called the International Botanical Association, which is to be inaugurated at a meeting to be held in the botanical laboratory of the University of Geneva on the 7th of August. "The chief object of the Association will be the foundation of a bibliographic periodical criticising in a perfectly impartial manner all botanical publications in such a way that the important be separated from the less so. It will not—as some periodicals do—devote page after page to publications of questionable value, while most important works are put off with two or three lines or even not mentioned at all. The criticisms will—at the desire of the contributors—be published in english, french or german. All will be submitted to the judgment of an editor nominated by the Association and responsible to it. Under no circumstances the membership will cost more than 25s., including the gratis delivery of the periodical." Dr. J. P. Lotsy, Wageningen, Holland, receives applications for membership.

THE *Botanical Gazette* for March contains a detailed and very trenchant criticism of "Some Recent Publications and the Nomenclatorial Principles they represent," from the pen of Mr. M. L. Fernald. It is based on Mr. Heller's recent *Catalogue of North American Plants*, to the methods of which we took exception on p. 119, but deals unsparingly with the "Rochester Code," and the results of its application. Mr. Fernald advocates the adoption of the Berlin rule for generic names, and "the so-called Kew rule of retaining the first specific name used under the accepted genus."

MESSRS. ROSCOE POUND and F. E. Clements have issued a handsome volume on the *Phytogeography of Nebraska*, embodying a general survey of "the result of nearly five years of active study of the floral covering of Nebraska, carried on by members of the Botanical Seminar in the Botanical Survey of the State:" it is "published by the Seminar" at Lincoln, Neb. The first edition of the work was issued in 1897, but the greater part of it was destroyed by fire. The work is of course mainly of local interest, but is very comprehensive; the table of contents occupies four pages of small print, the main division being into five chapters—I. Physiognomy and Climatology; II. Statistics and Regional Limitations; III. The Vegetation-Forms of the Flora; IV. The Ecological and Biological Relations of the Natural Groups; V. The Plant Formations: these headings, however, give no adequate idea of the amount and varied interest of the information contained in the volume. There is a very complete and rather extravagantly printed index of the plants referred to; the nomenclature is that of Britton and Brown's *Illustrated Flora*, and the objectionable innovation of trinominals is adopted. The convenience of the book for purposes of reference is greatly impaired by the absence of italics for the names of plants, the whole text being printed in excellent but uniform type; the inconvenience is intensified by the spelling of all specific names with a small initial letter.

UNDER the auspices of the Schweiz. botanisch. Gesellschaft, the elements of a great work on the Cryptogamic Flora of Switzerland are in course of publication. The composition of the several treatises being entrusted to acknowledged experts, the completed work is likely to be of an exhaustive character. We have just received the second part of the first volume—*Die Farnkräuter der Schweiz*, by H. Christ (Bern: K. J. Wyss. 1900. Pp. 189; 28 figures in the text. Price 4 francs)—which is a monograph of all the vascular cryptogams of the country, with the exception of *Equisetum*, *Lycopodium*, *Isoetes*, and *Selaginella*, an adequate census of which has not yet been made. Dr. Christ's contribution is divisible into three portions—a lengthy introduction, a handy key to the genera and species, and a systematic arrangement of the plants. In this last we find 23 genera, 53 species, 119 varieties and subvarieties, some 19 hybrids, and 25 sports—a precision of treatment which indicates the exhaustive manner in which the author has discharged his task. Interspersed are plenty of critical notes and records of the distribution at home and abroad. The introduction affords much attractive reading on such matters as the existing collections of dried ferns in Switzerland and the published literature; the variation and hybridization of the species; the influence of locality, soil, and altitude; plant-associations, geographical distribution, and so forth.

William Hodgson, who died at Workington, Cumberland, on March 27, was born at Raughtonhead Hill, near Dalston, in the same county, on April 7, 1824. At the age of seventeen he became parish schoolmaster at Watermillock, and later filled with much success a similar post at Aspatria. He was active in local politics in the Liberal interest, and in other ways was a useful member of the community. From a very early period Hodgson was interested in botany, and, largely owing to the encouragement of Mr. J. G. Baker, published in 1898 a *Flora of Cumberland*, which was noticed at some length in this Journal for 1899 (pp. 184–6). At the time of his death he was engaged on an account of Cumberland plants for the "Victoria History" of the English counties. He was elected an Associate of the Linnean Society in 1884.

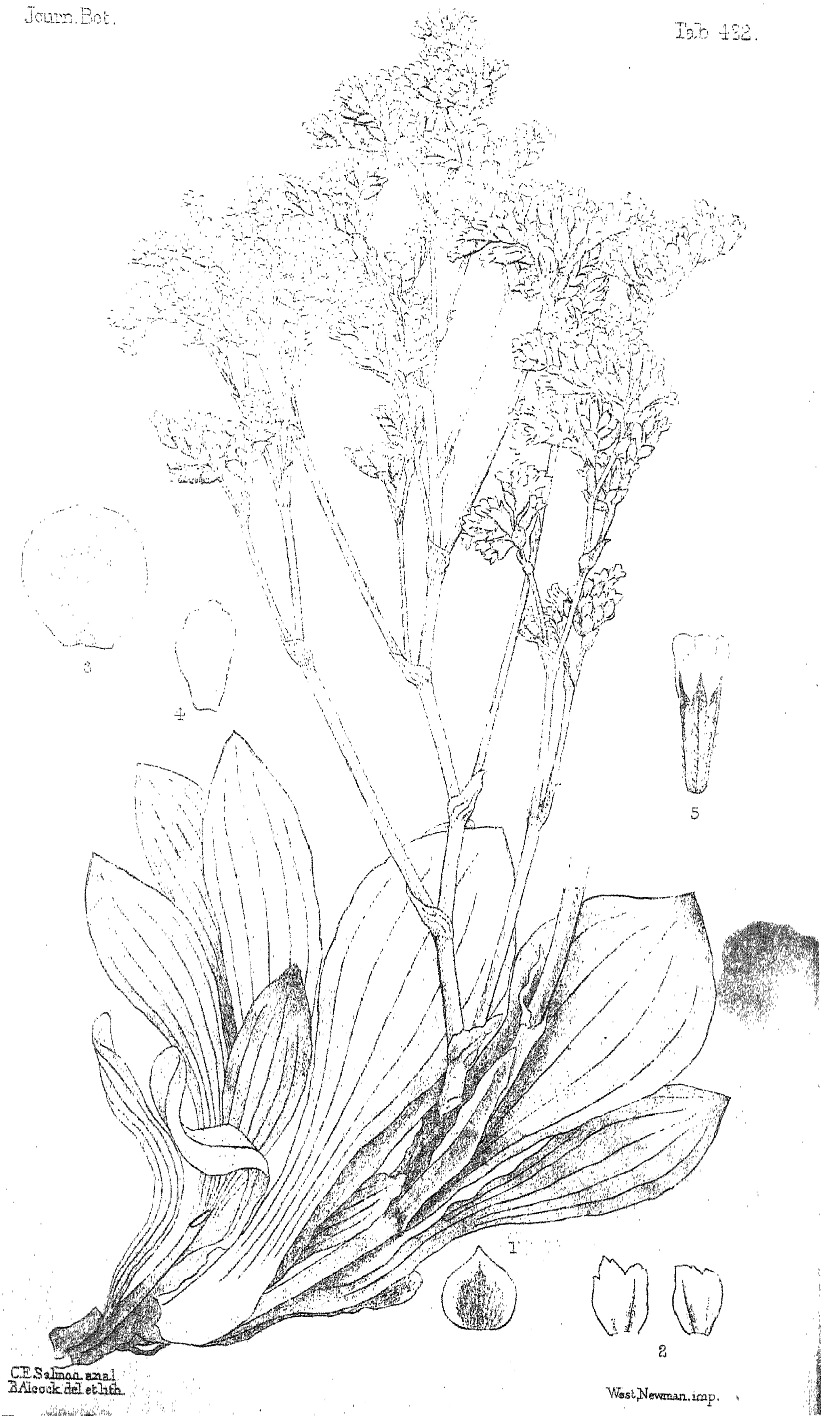
Dr. Peter Cormack Sutherland, who was prematurely included in the *Biographical List of British Botanists*, died at Durban, Natal, on the 30th of last November. He was born at Latheron, Caithness, in 1822, and graduated at Aberdeen in his twenty-fifth year. In 1850–1 he went on the expedition in search of Franklin, and published a Journal of his voyage in 1852. In 1853 he went to the colony of Natal, where he shortly became Government Geologist and (in 1855) Surveyor-General, a post which he held until his retirement in 1887. In Harvey's *Flora Capensis* he is mentioned as having sent "small but carefully selected collections made in various parts of his district during hasty professional visits; in one of which expeditions he discovered *Greyia Sutherlandi*, one of the most remarkable of South-east African shrubs." According to the *Gardeners' Chronicle*, in which a fuller account of Sutherland is given, he "had the honour of initiating into the ways and customs of South African life" Mr. Cecil Rhodes, who resided with him for several months in 1871, "before entering upon his great mission in life." Sutherland does not seem to have done any botany after this.

We take the following notice of Mr. Arthur Coppen Jones, who died at Davos Platz on March 8th, from the *British Medical Journal* for March 30 (p. 806):—

"Mr. Coppen Jones was born in London thirty-five years ago. He studied at the Royal School of Mines, where he won the Forbes prize. He had been intended for a life of pure science, and he worked at comparative anatomy under Huxley. But his health broke down when he was about twenty, and he went to Davos on account of pulmonary tubercle, which after some years healed, and never troubled him again. In the meantime he had taken up the study of bacteriology under Koch at Berlin. The medical men of Davos were not slow to avail themselves of his service for bacteriological work and chemical examinations. In the course of his extensive work in this direction, the occurrence of branched forms of the tubercle bacillus and the occasional presence of club-shaped bodies suggested a relationship with actinomydes. To test this view he worked in some of the pathological laboratories of Germany. The outcome of his researches was embodied in a paper in the *Centralblatt für Bakteriologie*, 1895, Nos. 1 to 3. He advanced reasons for regarding the tubercle bacillus as a mould of fungus [*sic*] instead of as a bacterium, and in a later paper suggested the name 'tuberculomyces.' The well-deserved recognition on the part of German bacteriologists of this careful piece of work stimulated Jones to further exertions. But he overtaxed his strength. While he was working in Zurich in 1896, symptoms of vesical tuberculosis appeared. This distressing ailment more than once seemed likely to become quiescent, as the same disease in the lung had previously done; but the restless energy of the patient and his devotion to work led again and again to fresh outbursts of activity. In spite of the great handicap such an illness inflicted, Jones translated Fischer's *Structure and Function of Bacteria* for the Clarendon Press. The translation, which appeared a few months ago, was very favourably received. Coppen Jones was a man of sterling worth, honest and painstaking in everything he did, and withal a good fellow."

Charlotte Mary Yonge, the well-known Anglican writer, to whose list of Hampshire (Hursley and Otterbourne) plants reference was made on p. 79, died at Otterbourne (where she was born on Aug. 11, 1827) on the 24th of March. Although not a botanist, Miss Yonge had much affection for and some knowledge of plants. *The Herb of the Field*, which first appeared in a little magazine then under Miss Yonge's editorship, was printed as a volume in 1853, and again in 1858; it is a pleasant little book, in the style of which Miss Anne Pratt was a better known exponent. She also supplied the letterpress for a folio volume of plates (first printed abroad), entitled *Lessons from the Vegetable Kingdom*; this was first published in Edinburgh in 1857, and went through several editions.

The *Daily News* has been indulging in botany, with the usual result. From its columns (April 17) we learn that "botanists regard the beautiful rambling hedge rose of our country lanes as the original stock whence all the delightful varieties of the double roses of our gardens sprang." We are also told that "railway travellers often mistake" the "yellow grouping" of the lesser celandine "for another gold dainty of early spring, the gorse," and that "the elegant snowdrop grows in gleaming tufts in every hollow."; and so on.



C.E. Salmon anal.
E. Alcock del. et lith.

West, Newman imp.

LIMONIUM LYCHNIDIFOLIUM VAR. CORYMBOSUM.

By C. E. Salmon.

(Plate 422.)

Last August, as announced in this Journal for 1900, p. 483, Mr. C. R. P. Andrews discovered this plant in Alderney, where he found it growing sparingly on low rocks by the sea, in company with *Limonium occidentale*. This is a new record for the Channel Island Flora, although it is known to occur in many places on the west coast of France, and also in Normandy; and it is possible that this striking and distinct-looking plant may be found in Great Britain itself.

I have followed Dr. Kuntze in adopting the earlier name *Limonium* for the genus which appears in our books as *Statice*. The synonymy of the plant under description is as follows:—

Limonium lychnidifolium O. Kuntze, Rev. Gen. Plant. ii. 395 (1891).
Statice auriculæ-ursifolia Pourr. in Act. Acad. Toul. iii. 330 (1788), pro parte.
S. auriculæfolia Benth. Cat. Pl. Pyren. 123 (1826) pro parte et auct. pl., non Vahl.
S. lychnidifolia Girard in Ann. Sci. Nat. sér. 2, xvii. 18 (1842).
—var. corymbosum.
S. lychnidifolia β *corymbosa* Boiss. in DC. Prodr. xii. 647 (1848).

Girard's original description of his *lychnidifolia* (omitting for the present Pourret's plant) was published in 1842, and may be translated: "*Leaves* more or less obovate, rather broadly acuminate, scurfy-pulverulent; lowest *scale* of the scape often differing from the upper; *branches* stiffly erect, distichous; *spikes* erecto-spreading, subcongested, rather dense; *inner bract* exceeding the outer three times*; *calyx* very obtusely 5-lobed; reproductive organs exserted; anthers oblong."

In the long and careful account which follows, Girard further distinguishes his plant. I give what seem to be the most valuable specific characters in condensed form:—*Plant* 6–18 in. high; rather robust. *Root* stout, woody. *Leaves* 2–4 in. long or more, ½–1 in. wide, more or less obovate, sometimes subrotund or obovate-lanceolate, rather broadly acuminate, subacute (usually tapering to an obtuse point); apiculate (or not); scaly; glaucous; petiole 2–4¼ lines wide, longer (or shorter) than the blade; 5–9-veined. *Scape* (tapering from base) branched in its upper third (or in its upper half). *Scales* usually varying in shape; the lowest foliaceous, ½–1½ in. long, ½–6 lines wide, the others smaller (and decreasing to) 2–3 lines long, 2 lines wide, ovate-triangular, acuminate, with a scarious margin. *Branches* stiffly erect, 1–3 in. long (lowest ones, with spike, 2½–3 in. long); (panicle broadest about the middle); (no sterile lower branches). *Spikes* ¼–1 in. long, dense-flowered, spreading, at first straight, then recurved. *Spikelets* 2–4- (3–5-) flowered; not congested. *Outer and middle bracts* ⅞–1⅛ lines long. *Inner bract* 2⅛–2¾ lines long; 3 (2¼–2½) times longer than the outer bract. *Bracteoles* (1–3 in each spikelet) a little shorter than inner bract, frayed at the apex, (slightly gibbous). *Calyx* with very obtuse short subrotund lobes; tube rather hairy; (teeth of veins short, broad-based, acute; veins usually hairy, more copiously so near base, occasionally half-way up teeth).

---

* Probably by a printer's error, the words "inner" and "outer" have their positions reversed in his original description.

I have added in brackets certain variations from and additions to Girard's description; these are the results of an examination of an undoubted example of *lychnidifolium* in Herb. Brit. Mus. collected by Companyo in 1852 near Perpignan and Sainte-Lucie (Aude). (Fl. Gall. et Germ. Exsicc. C. Billot. No. 1053).

The variety *corymbosum* was first described (under *Statice lychnidifolia* Gir.) by E. Boissier in De Candolle's *Prodromus* in 1848, where we find this diagnosis:—"*β. corymbosa*, paniculâ minus ramosâ confertiore ramorum inferiorum elongatione subcorymbosâ."

A close examination of Mr. Andrews's plant, which is, I think, best placed under this variety, gives the following further points of difference from true *lychnidifolium*:—*Plant* 8–10 in. high. *Scape* branched below the middle, often from quite close to its base. *Branches* (lowest) very long, 3–4¾ in. with spike, forming a broad panicle usually broadest above the middle and so rather corymbose; very rarely 1–2 sterile lower branches. *Spikes* ¼–⅝ in. long. *Spikelets* 1–2-flowered, usually 2. *Outer bract* 1⅜–1½ lines long. *Inner bract* 2½ lines long, scarcely twice as long as outer. *Bracteoles* 1 in each spikelet (or 0 in the 1-flowered spikelets), strongly gibbous.

L. lychnidifolium and its var. *corymbosum* may be distinguished from our other British species as follows:—

L. occidentale O. Kuntze (*Statice occidentalis* Lloyd) is a more slender plant with lanceolate-spathulate and smaller leaves (never so broad), 1–3-veined; scales of the scape varying but little in size (about 4–1⅛ lines long), and never foliaceous; spikes ascending-spreading, never horizontal or recurved nor so congested as in *lychnidifolium*; teeth of calyx-veins longer, narrow and very acute.

Mr. C. R. P. Andrews also noted that in his plant, when growing, the rich brown colour of the bracts showed up the scarious calyx in stronger contrast, as compared with the species in question.

L. Dodartii O. Kuntze (*Statice Dodartii* Girard) is nearer *lychnidifolium*, and is quite as robust; it is distinguished by the stout scape, which hardly tapers at all from base to apex; by its leaves, which are not so large, and which are rounded (or very obtusely pointed) at the apex, 3–5-veined; its spikes are rigidly erect, subvertical, never spreading or horizontal, and its panicle narrow and elongated; also the scales vary but little in size (about 2½–1 line long).

I omit mention of the plant called *intermedia* by Syme, as this and forms near it require further study.

The earlier name for the species, *Statice auriculæ-ursifolia* of Pourret, cannot stand as a synonym of *L. lychnidifolium* without the words "pro parte" being added; in the British Museum Herbarium is a sheet from Pourret on which are specimens of both *lychnidifolium* and *Girardianum* (*Statice densiflora* Girard), which seems to show that Pourret included two plants in his description.

I should be very grateful for the loan of any dried examples of British *L. occidentale*, *Dodartii*, and *intermedium*, for the study of this particular group of *Limonium*; any fresh living specimens sent to "Clevelands," Reigate, Surrey, would also be extremely useful.

I have to express my thanks to Mr. C. R. P. Andrews for notes on the finding of the plant, and to Mr. Britten for help given in the preparation of this paper.

EXPLANATION OF PLATE 422.

Limonium lychnidifolium O. Kuntze, var. *corymbosum*, natural size, drawn from an Alderney specimen:—1. Outer bract. 2. Middle bract. 3. Inner bract. 4. Bracteole. 5. Calyx. All enlarged four times.

"STATICE PUBESCENS SM."

BY THE EDITOR.

MR. DRUCE in the recently issued number of the Linnean Society's *Journal** follows Dr. Otto Kuntze in placing under *Statice* the Thrifts, which have usually been called *Armeria*, and in adopting *Limonium* for the Sea-Lavenders; and in this change all who accept the rule of priority will concur. He recognizes three species as British, thus following Boissier, though with some hesitation, in regarding *Armeria pubescens* Link as entitled to specific rank. This view, so far as I have been able to ascertain, is not maintained by most British botanists, but the limits of a species are of course matters on which there will always be differences of opinion: Mr. Druce's method of dealing with the subject, and his creation of "varieties or subvarieties" both of *S. maritima* and *S. pubescens*, does not, however, inspire confidence as to their claim to specific distinction. Meanwhile I think it is clear that if the latter is to figure in our lists as an independent species, it must do so under a name other than that given by Mr. Druce.

Mr. Druce writes the name "*S. pubescens*, Sm. ex Schult. Syst. vi. 772." In the *Index Kewensis* it stands "*S. pubescens* Sm. ex Schult. Syst. vi. 772 (cum cit. falsa)"—an important qualification which Mr. Druce ignores. Schultes (*l. c.*) writes "*Statice Armeria* Linn. . . . . Smith Brit. i. p. 341. Engl. bot t. 226 (sub *pubescente*)"; but in neither of the works cited does Smith employ the name *pubescens*. It will hardly be contended that Smith can be credited with the name on the authority of a false citation; and it cannot be assigned to Schultes, who does not himself employ it.

---

* Botany, vol. xxxv. No. 242, pp. 66, 67 (April, 1901). The present seems a suitable opportunity for expressing our regret that, owing to the non-publication of a note sent to this Journal in 1898, Mr. Druce should feel himself unable to contribute to our pages papers like the present, which would thus be more accessible to British botanists than they can be in the Journal of a learned Society. It would, we are sure, be as satisfactory to the readers of this Journal as to its Editor if Mr. Druce could see his way to a renewal of the old relations between us.

I do not know the date of "*Armeria pubescens* Link in Repert. Nat. Cur. Berol. i. 180"—a reference to a work which neither Mr. Jackson nor Mr. Druce seems to have seen, and which is not in the library of the Natural History Museum; but those who follow the rule of retaining the first name given under the accepted genus will probably call the plant under discussion *S. linearifolia* Laterrade, *Fl. Bordelaise*, ed. 2, p. 189 (1821). The earliest edition to which I have access is the fourth (1846); in this *S. Armeria* var. *pubescens* DC. is cited as a synonym, and it is so placed (with a mark of certainty) by Godron (Fl. France, ii. 733), who adds, "non Riedel." "Riedel" is probably a misprint for "Loisel"; there was an earlier *linearifolia* of Loiseleur (Fl. Gallica, 182 (1806)), but on a later page (723) of the same work, the author says: "*Statice linearifolia* N. non est species nova et distincta, sed vera *S. Armeria* Linnæi."

The synonymy of the plant as a species is:—

STATICE LINEARIFOLIA Laterr. Fl. Bordelaise, ed. 2, p. 189 (1821).
Armeria pubescens Link in 'Repert. Nat. Cur. Berol. i. 180' (? date); Boiss. in DC. Prodr. xii. 680 (1848).
S. pubescens Druce in Journ. Linn. Soc. (Bot.) xxxv. 76 (1901).

Those who follow the rule of adopting the oldest trivial will retain the name *pubescens* (with, I presume, Mr. Druce as the authority); Mr. Druce has not adopted that rule in his treatment of *Limonium*, where he retains *L. lychnidifolium** for a plant which (under *Statice*) has an earlier trivial, as will be seen from Mr. Salmon's paper in the present number of this Journal (p. 193).

I do not add under *S. linearifolia* the varieties named by Mr. Druce under *S. pubescens*, partly because I have not knowledge sufficient to enable me to arrive at a definite conclusion as to their value, but still more because the practice of transference on purely literary grounds can only increase synonymy, and seems prompted mainly by a desire to associate one's name with new combinations. I am sorry to see that Mr. Druce, in addition to the arrangement which he adopts for *Statice*, indicates an alternative which necessitates three fresh combinations, all duly set forward. A further and more striking example of this objectionable practice is found in the last report of the Botanical Exchange Club (p. 599), where Mr. Druce, having described a new variety of *Buda media* as "var. *glandulosa* mihi," continues:—"I have ventured to give it the above name, whether it be considered a variety either under the generic names *Buda*, *Arenaria*, *Tissa*, or *Spergularia*, and, with the alteration of the terminal letter, under *Lepigonum* or *Urion*, for it is blessed with an astounding variety of synonyms." It would appear from this that Mr. Druce has here at one stroke created six combinations —or seven, for "*Urion*" is of course a misprint for "*Corion*," a generic name which cannot be used if 1753 be taken as the starting-point of nomenclature. Whichever be accepted, the remainder must, I presume, be cited by a future monographer as synonyms, unless such wholesale naming can be ignored by common consent. This proceeding, which has lately been suggested from Berlin, would be difficult if not impossible of execution; we can only appeal to botanists to avoid a practice which, however gratifying to an individual, can only result in unnecessary additions to our already encumbered synonymy.

---

* It may be noted here that *Limonium occidentale*, for which Mr. Druce gives no authority, is so called by Dr. Kuntze on the same page for which *L. lychnidifolium* is cited. Mr. Druce does not tell us why he leaves *L. Dodartii* O. K. as a variety of *auriculæfolium* while he gives *L. occidentale* as a separate species: Mr. C. E. Salmon (see p. 193) considers the three plants distinct.

QUEENSLAND ORCHIDS.

By A. B. Rendle, M.A., D.Sc.

We are again indebted to Mr. J. Sparkes for two interesting Orchids which he has received from his correspondent in North Queensland, Mr. Arthur Owen Jones, J.P. The specimens will be found in the National Herbarium.

The first is a form of *Cymbidium Sparkesii* nob., received from the same source and described in this Journal for 1898 (p. 221). Like the type-specimens, it shows the longer ligulate perianth-leaves which is the chief distinction from its nearest ally, *C. canaliculatum* R. Br., but approaches the latter in its less deep crimson colour and its crimson-spotted lip.

The second is a new *Dendrobium*.

Dendrobium (Stachyobium) **Jonesii**, sp. nov. Planta caulibus simplicibus 6–12-pollicaribus anguste fusiformibus teretibus plurivaginatis, basi subtumidis, apice specimine 4-foliatis; foliis anguste ellipsoideis basi angustatis apice breviter acutis; racemis subterminalibus folia subæquantibus gracilibus nutantibus specimine 12-floris, bracteis minutis ovatis obtusis; floribus albidis, sepalis petalisque erecto-patentibus, subacutis, sepalo dorsali anguste triangulari, sep. lateralibus subfalcate-triangularibus, basi cum pede columnæ mentum obtusum efficientibus; petalis sepala æquantibus linearibus subacutis; labello breviore concavo glabro transverse purpureo-striato, lobo terminali truncato subobtuso, lobis lateralibus brevibus obtusis, disco cum carina flava mediana instructo; columna superne purpureo-maculata.

Habit of *D. gracilicaule*, but a larger plant with stouter more fusiform stems 8–11 mm. in greatest diameter. Leaves about 10 cm. long by 2·5–3 cm. broad. Fertile bracts brownish, membranous, 2 mm. long; flower-stalks 8 mm., white; ovary green, 2 mm. long. Sepals 12 mm. long, the dorsal 3 mm., the lateral 4 mm. broad at the base. Petals 1·7–8 mm. broad. Lip barely

6 mm. long, 5·5 mm. greatest breadth when flattened, terminal lobe 1·25 mm. long by 4·75 mm. broad. Column 3 mm. long, foot 3·5 mm. Anther-cap rounded, pollinia deep yellow, cohering in pairs. Mr. Sparkes says: "Sometimes, usually early in the day it is very sweet-scented, later no trace of scent is to be perceived."

Nearly allied to *D. gracilicaule* F. Muell., but apparently a larger plant with stouter more fusiform stems, cream-coloured flowers and sepals not spotted, more pointed perianth-leaves, and narrower petals. The lip also has shorter lateral lobes, and the disc bears a single, not a trilamellate keel. *D. gracilicaule* has a more southern subtropical distribution, occurring in New South Wales and as far north as Moreton Bay, in Queensland; the present species is well within the tropics.

D. Jonesii is evidently closely allied to, and may be identical with, *D. gracilicaule* var. *Howeanum* Maiden (in Proc. Linn. Soc. N.S. Wales, xxiv [errore xxv], 1899, 382), from Lord Howe Island. This agrees in the stouter stem and the colour of the flowers, but the author makes no mention of any differences in form and size of sepals, petals, and lip.

Hab. Near Geraldton, Johnstone River, North-east Queensland, *A. Owen Jones, Esq., J.P.*

Flowered by Mr. J. Sparkes at Ewhurst, Surrey, January, 1901.

NOTES ON POTAMOGETON.

By Arthur Bennett, F.L.S.

(Continued from Journ. Bot. 1900, p. 130.)

Potamogeton fluitans Roth. The following extract from Roth's *Catalecta Botanica* (fasc. 1, p. 31, 1797) will show that Schreber's specimens in the Munich Herbarium are, as I supposed, the plant of Roth: "*Potamogeton fluitans* foliis inferioribus longissimis, lanceolatis, acuminatis, membranaceis; superioribus ovali-lanceolatis, cariaceis omnibus petiolatis. *Roth*, Fl. Germ. tom. 1, pag. 72; tom. 2, pars 1, pag. 202, no. 2. Prope *Erlangam* etiam observavit Ill. Praes. *de Schreber*."

To the best of my belief these specimens represent the plant accepted by European botanists as the plant of Roth.

P. polygonifolius Pour. In his account of this plant (as *P. oblongus* Viv.) in *Linnaea*, ii. 216 (1827), Chamisso says: "Hujus loci forsitan est: Potamogeton de St. Pierre Miguelon près Terre-neuve in Herb. Brongniart, sed major." Since that time I know of no record of the species from the American continent. Specimens allied to it occur in Chili!, Uruguay!, Argentina!, &c., but they are not the same. I have not seen Brongniart's specimen, and Dr. Morong does not include *polygonifolius* in his *N. American Naiadaceæ;* but, from the occurrence of *Calluna* in Nova Scotia and Newfoundland, I have been expecting to hear of its occurrence in Canada. Prof. Macoun has now sent me specimens from Sable

Island, about a hundred miles from the coast of Nova Scotia, just such as one might gather on a Scottish moor.

Sable Island is some two hundred and seventy-five miles from the Isle of Miguelon and St. Pierre, off Newfoundland; the next nearest points in which it has been gathered are, I believe, the Azores (about fifteen hundred miles), Madeira, and the Canaries. On Sable Island the plant occurs in shallow pools where water was deeper earlier in the spring; indeed, in some places the pools were almost dry. It was the common species in the shallow or (nearly) dried up pools. *Lobelia Dortmanna*, *Polygonum hydropiperoides*, and *Myriophyllum tenellum* occurred with it. In a deep pool on the island there also occurred *P. perfoliatus* L., *P. pectinatus* f. *pseudomarinus* Ar. Benn., *P. pennsylvanicus* Cham., and *P. pusillus* L. var. *capitatus* Ar. Benn.

I hope the plant will now be searched for, particularly by botanists in Nova Scotia and Newfoundland. Originally Sable Island consisted of two adjacent islets, but it is now, according to Prof. Macoun, merged into one, and is "a bank of sand about twenty-one miles long, and from one hundred yards to one and a half mile in width. The lagoon that receives the sea-water is about nine miles long; at the point where the lagoon ends is a sand-bank, which shuts off the lagoon from a series of pools of fresh water which were certainly part of the lagoon long ago."

P. LUCENS L. var. CONNECTICUTENSIS Robbins. Dr. Morong, when sending me specimens after the publication of his monograph, wrote, "I think this should go rather to *P. Zizii* than to *lucens*," and in this I entirely agree. It will stand as *P. Zizii* Roth var. *Connecticutensis* Morong in litt. = *P. angustifolius* Bercht. & Presl. var. *Connecticutensis* mihi.

P. FAXONI Morong, Naiad. N. Amer. (Mem. Torr. Club, iii. 22 (1893)). The plant here described by Dr. Morong as a new species was named by its finder "P. rufescens?"; others suggested *P. lonchites*, and in this Journal for 1890, 301, I suggested it might be a hybrid. It was afterwards found that specimens of *rufescens*, *lonchites*, and a third doubtful plant had been distributed as if the same. The plant seemed to approach *lonchites* on one side, and, though less nearly, *rufescens* on the other. When specimens were first sent me by Dr. Morong, I suggested to him it was possibly *Claytonii* × *rufescens* (*alpinus*). Further specimens did not support the affinity with *rufescens*, but I still have some difficulty in regarding them as distinct from *lonchites*, and am still of opinion that the two specimens first sent are different from all those sent later, and that the upper leaves very closely resemble those of *P. Claytonii* Tuck. In its submerged leaves *lonchites* has a wide range of variation—in some specimens leaves 13 in. × ¼ in., in others 15 in. × 1¼ in.; the latter form will likely enough some day be suggested as *lonchites* × *amplifolius* Tuck.

P. NITENS Weber ?. Prof. Macoun sends me specimens of two remarkable plants collected by Mr. W. Scott in 1897 at Navy Island, and at Queenstown, Ontario. Although unlike in habit, I believe them to belong to the same form, which, I think, must be referred to *P. nitens*, but in a form not found in Europe, as they are probably produced by the var. *Richardsonii* of *perfoliatus*, the leaves being elongated in the same proportion, and so much longer than any European form of *nitens*. Not only this, but one of these specimens assumes the closely branched habit of that var. of *perfoliatus*, with the dark and shining colour of *nitens*.

The Rev. E. J. Hill sends me, from "St. Mary's River (in deep water), often 6 ft. long; Sault Ste Marie, Michigan, U.S.A.," a plant that I am unable to refer to any other than *nitens* Web.; in fact, it bears a remarkable resemblance to Dr. Scully's specimens from Kerry, Ireland. Mr. Hill writes that it grows in deep water with strong current. There are two or three spikes of flowers, and these show the closed state usual in *nitens*. If Macoun's plant is a product of the elongated leafed form of *perfoliatus* v. *Richardsonii* (often 4¼ in.), this will perhaps be the case with the intermediate form, which seems absent in Europe. Forms approaching the American have been sent so named, but I have not been able to convince myself they are so.

I have seen *nitens* from the following localities in North America: Wenham, Mass. (one specimen identical with some of Nolte's Schleswig-Holstein specimens); Indian River, Millsboro', Delaware, 1885, *A. Commans;* and the stations already given from Rev. E. J. Hill and Prof. Macoun.

P. DIMORPHUS Rafin. (*P. Spirillus* Tuck.) A very interesting extension of the distribution of this species has been sent me by the Rev. O. Hagström; specimens from Brazil gathered by Dr. Lindman in 1892. In the United States, I do not know of it south of Virginia (about 35° N. lat.), whence I have specimens; but the allied species, *P. diversifolius* Rafin. (*P. hybridus* Michx.), ranges south to San Luis Potosi, Mexico! (25° N. lat.) on the west, and to Cuba! on the east of the continent. It is possible that when the intervening countries are more thoroughly examined one or the other of these species will be discovered. In the British Museum Herbarium is a specimen, "Bahia Blanca. B. Ayres, Argentina, 1884. M. G. Mansel, R.N.," which is allied to *P. amplifolius* Tuck., but the lower (middle) leaves are tapering into the petiole. Further specimens would perhaps connect the two, and prove another interesting extension. *P. amplifolius* occurs south to Forida, *Chapman*, 1844! (as *P. natans*).

P. ACUTIFOLIUS Link. In Schreber's herbarium at Munich are specimens of this plant labelled "Lancaster, Pennsylvania, Muhlenberg." I asked Dr. Morong his opinion of this; he replied that he thought there was a mistake in the label. He wrote further: "Dr. Porter, of Lafayette College, has been all over that region, and two keen-sighted students of ours have been fishing in these waters for the last two years; none of them has found this species, or my *Hillii*. *P. zosterifolius* occurs in the region, as well as further north." There is no question that the specimen is *acutifolius*, and, although perhaps some transference of labels may have taken place, it would be well for American botanists to keep it in mind.

P. ANGUSTIFOLIUS Bercht. & Presl (*P. Zizii* Roth). Prof. Macoun sends from Ontario, collected by Mr. W. Scott, a very interesting form of what appears to be the above plant. It is a characteristic specimen showing the lower leaves of *lucens* (or rather *longifolius*), and the floating ones of *heterophyllus*. Dr. Morong gives "leaves (submerged) 2–6 in. long," but these are 12 in. and over, though the floating leaves are only those of fine *heterophyllus*.

P. PUSILLUS L. var. nov. CAPITATUS. This was sent me by Prof. Macoun from Sable Island, and I have also specimens from the "Spallumsheen River, British Columbia, 10.7.1889, leg. J. M. Macoun," which I had wrongly referred to my var. *elongatus*. The present variety differs from the usual form of *P. pusillus* by the long and exactly linear leaves, tapering only at the extreme end, the prominent medial nerve, the long and very slender peduncles (the heads of flowers at a short distance looking as though they are elevated above the plant without any peduncle), and the extraordinary long hafts to the sepals (perianth-segments); these are as long and often longer than the segment itself (the usual state being something like a sixth of the segment); and the fruit-stems approach in character to those of my *P. Aschersonii* rather than the usual form of *pusillus*.

P. PUSILLUS L. var. nov. PSEUDO-RUTILUS. Habit of *P. rutilus* Wolfg., but with nearly the fruit of *pusillus*. Leaves linear attenuate, rigid, spreading, central nerve prominent, laterals almost obsolete; stipules appressed to the stem, in the upper branches all as long as the internodes; apical propagating-buds abundant; peduncles one inch; spikes dense-flowered. Differs from any form of *pusillus* known to me by its extreme rigidity, and the leaves all spreading like a fan, by the substance of the leaf being nearly taken up by the central nerve, by the strong and appressed stipules, and its likeness to *rutilus* in habit.

Lake Scugog, Ontario, Canada, 1897, *W. Scott, ex Prof. Macoun*; Wolf Lake, Indiana, U.S.A., 1900, *Rev. E. J. Hill*.

P. CRISPUS L. Since the publication of the *North American Naiadaceæ* this species has been found in Canada. Morong overlooked the fact that Pursh gives it from "Canada to Virginia" in his Fl. Am. Sept. 120, 1814, marking it "v v." as having seen a living specimen, and referring to Curtis's Fl. Lond. and *Flora Danica*, t. 927. At a meeting of one of the American Botanical Societies, Dr. Morong noted that it had been found in Arizona (Bull. Torr. Bot. Club, 1886, 171); here he considered it had been introduced by birds. The oldest dated American specimen I can find in England is in Mr. Cosmo Melvill's herbarium, "Philadelphia, 1841–2, Gavin Watson & Kilvington." One from Delaware in the British Museum Herbarium is probably older: it was collected by R. Eglesfeld Griffith, of Philadelphia, whose name is not in Prof. Harshberger's volume on Philadelphia botanists. Prof. Macoun now sends it from lakes at Niagara.

(To be continued.)

BIBLIOGRAPHICAL NOTES.

XXVII.—THE DATES OF HUMBOLDT AND BONPLAND'S "VOYAGE."

So much difficulty is found by workers in ascertaining the dates of books which have been published in parts, that we do not hesitate to place on record the results of an effort to elucidate the periods of the actual publication of the zoology and botany of the *Voyage aux régions équinoxiales du Nouveau Continent*, &c., by Humboldt and Bonpland. With the exception of the two parts of the *Monographia Melastomacearum*, dealing respectively with the *Melastomæ* and *Rhexieæ*, our account is fairly complete; anyone possessing the unbound livraisons will confer a favour on us and on others by filling up the gaps which remain in our list.

The brief account of the zoology has already appeared in the Ann. Mag. Nat. Hist. for 1899, but as we are able to add to the information there given, we reprint it here, in order that the record for the whole work may be, as far as possible, complete.

ZOOLOGIE (RECUEIL D'OBSERVATIONS DE).

This book was issued in livraisons as follows:—

Vol. I., livr.	1,	pp. 1–46 (& 47, 48),	**1805**,	forming pp. 1–25 of 2nd issue.
	2,	49–104,	**1807**,	,, 26–64 ,,
	3,	105–196,	**1807**,	,, 65–126 ,,
	4,	197–293,	**1809**,	,, 127–200 & 253–259 of 2nd issue.
	5 & 6,	294–412,	**1809**,	,, 261–297 & 201–252 & 298–309 of 2nd issue.

A break then occurred until 1812, when livraison 7 was issued, with the following "Avis" on a loose slip of paper:—"Avec cette Livraison, qui terminera le premier volume des Observations de Zoologie et d'Anatomie comparée, on fournit aux Abonnés un nouveau texte pour la totalité de ce volume. On a cru devoir faire ce sacrifice, afin que cet ouvrage resemblât, pour le caractère et le papier, à toutes les autres parties du Voyage de M. de Humboldt. Les Acquéreurs pourront faire relier ce volume; ils rendront tout le texte des livraisons précédentes, dont il ne conserveront que les planches." Fortunately for nomenclature, the British Museum (Natural History) secured some years ago a parcel of odd parts, which prove to be a complete set of the first issue; these are properly cared for, and are of considerable interest.

The completion of the work dates as follows:—

Livr. 7, pp. 305–368 (with reprint of pp. 1–412 of 1st issue, forming pp. 1–309 of 2nd issue), **1812** (title-page dated 1811), Bibl. Franç. 7, viii. 1812.

Vol. II., livr.	8,	1–64,	**1813**	(Bibl. Franç. 2, i, 1813).
	9,	65–96,	**1813**	(,, 24, ix, 1813).
	10,	97–144,	**1817**	(,, 13, xii, 1817).
	11, 12,	145–224,	**1821** **1821**	(,, 15, ix, 1821).
	13,	225–256,	**1827**	(,, 17, i, 1827).
	14,	257–352,	**1832**	(,, 15, xii, 1832). (Title-page dated 1833).

BOTANIQUE.

PLANTES ÉQUINOXIALES*:—VII, 234; 191, Pref. dated 1805.

Livr. 1,	sheets.	pp. 1–8,	2 pls.	J. Gén. Litt. Fr.,	viii (5) 131.	**1805.**
2,		9–38,	10	,, ,,	viii (8) 229.	**1805.**
3,		39–72,	10	,, ,,	ix (6) 161.	**1806.**
4,		73–106,	11	,, ,,	ix (10) 291.	**1806.**
5,		107–138,	9	,, ,,	x (4) 101.	**1807.**
6,		139–170,	9	,, ,,	xi (1) 2.	**1808.**
7,		171–202,	49–57	,, ,,	xi (2) 34.	**1808.**
8,		203–232,	58–65	,, ,,	xi (4) 98.	**1808.**
Vol.II. 9,	T.P. to vol. ii., double frontispiece, &	1–20,	66–68	,, ,,	xi (11) 323.	**1808.**
10,		21–36,	74 & 81	,, ,,	xii (2) 34.	**1809.**
11,						
12,						
13,	already published	–88,		Bibliographie Français,	22 Nov.	**1811.**
14,	[4]	89–104,	106–113	,, ,,	16 Ap.	**1812.**
15,	5	105–124,	8	,, ,,	12 Feb.	**1813.**
16,	7	125–152,	8	,, ,,	1 Oct.	**1813.**
17,	10 (end)	153–191,	11	,, ,,	21 June	**1817.**

MELASTOMACEÆ:—MELASTOMES, VI, 146; RHEXIES, II, 160.
Preface dated 1806; of II, dated 1823.

Livr. 1,		(Melast.)					**1806.**
2,		(Rhex.)					?
3,		,,					?
4,		(Melast.)	pp. –18,	5–9 pls.	J. Gén. Litt. Fr.	x (4) 101.	**1807.**
5,		,,	19–34,	10–15	,, ,,	x (7) 194.	**1807.**
6,		,,	35–43,	16–20	,, ,,	x (11) 323.	**1807.**
7,		(Rhex.)	–40,	–15	,, ,,	xi (5) 131.	**1808.**
8,		,,	41–56,	16–20	,, ,,	xi (9) 258.	**1808.**
9,		(Melast.)	44–		,, ,,	xii (8) 228.	**1809.**
10,		,,					
11,		,,					
12,	2	,,	–80,	4	Bibl. Franç.	22 Nov.	**1811.**
13,	4	,,	81–96,	5	,,	26 June	**1812.**
14,	3	(Rhex.)	57–68,	5	,,	9 Oct.	**1812.**
15,	3	,,	69–80,	5	,,	22 Jan.	**1813.**
16,	3	,,	81–92,	5	,,	11 June	**1813.**
17,	3	(Melast.)	97–108,	5	,,	13 May	**1815.**
18,	6	,,	109–132,	4	,,	3 Aug.	**1816.**
19,	4	,,	133–end,	5	,,	26 Oct.	**1816.**
20,	3½	(Rhex.)	93–104,	5	,,	21 Mar.	**1818.**
21,	4	,,	105–120,	6	,,	1 July	**1820.**
22,	4	,,	121–136,	5	,,	28 Ap.	**1821.**
23,	3	,,	137–146,	5	,,	5 July	**1823.**
24,	5½	,,	147–end,	5 (Fér., Bull. 1823, iv, 53);	,,	30 Aug.	**1823.**

In the *Gött. gelehrt. Anz.* 1809, p. 1777, *Mélastomés*, pp. 1–46, pls. 1–20, and *Rhexies*, pp. 1–40, pls. 1–15, are reviewed as 1806–1808.

NOVA GENERA ET SPECIES PLANTARUM.

This consists of seven volumes, as follows:—

Vol. I,	lviii, 377;	Pref. dated	**1815.**	55 shts.,	96 pls.
II,	406;	T.P. ,,	**1817.**	51 ,,	96 ,,
III,	456;	T.P. ,,	**1818.**	57 ,,	108 ,,
IV,	312;	T.P. ,,	**1820.**	39 ,,	112 ,,
V,	432;	T.P. ,,	**1821.**	54 ,,	103 ,,
VI,	542;	T.P. ,,	**1823.**	68 ,,	93 ,,
VII,	506;	T.P. ,,	**1825.**	66 ,,	104 ,,

---

* The dates of the parts are followed by the authority for these, when known.

The dates of the parts are :—

Livr. 1, 2,	44 shts.	Vol. I, pp 1–	44 pls.		Bibl. Franç.,	3 Feb. **1816.**
3,	20		25		,,	2 May **1816.**
4,	25½		27		,,	31 Aug. **1816.**
"4,"	13½	Vol. II, pp. 1–	25		,,	3 May **1817.**
6,	18		25		,,	13 Dec. **1817.**
7,	17		22		,,	28 Feb. **1818.**
8,	50		34 [? 24]		,,	6 June **1818.**
9,	20	Vol. III, pp. 1–	25		,,	3 Oct. **1818.**
10,	19		15		,,	13 Feb. **1819.**
11,	19		25		,,	17 July **1819.**
12,	18		25		,,	27 Nov. **1819.**
13,	15		9		,,	11 Mar. **1820.**
14,	14	Vol. III, 417–456 IV, 1–72	25		,,	15 Ap. **1820.**
15,	16	pp. 73–152	25	326–340	,,	27 May **1820.**
16,	12		24		,,	22 July **1820.**
17,	12		24		,,	16 Sept. **1820.**
18,	9		13		,,	24 Dec. **1820.**
19,	16	Vol. V, pp. 1–	24		,,	26 May **1821.**
20,	14		24		,,	29 Sept. **1821.**
21,	16		20		,,	23 Feb. **1822.**
22,	15		20		,,	29 June **1822.**
23,	25½	305–end	15	Fér. Bull. 1823, ii, 84;	,,	22 Mar. **1823.**
24,	28	Vol. VI, pp. 1–72	37	,, ,, ,, 472;	,,	19 Ap. **1823.**
25,	17	73–178	15	,, ,, iv, 55;	,,	30 Aug. **1823.**
26,	15	179–240	15	,, ii, 1824, 45;	,,	24 Jan. **1824.**
27,	16	241–320	17	,, ii, ,, 165;	,,	24 Ap. **1824.**
28,	15	321–392	16	,, v, 1825, 71;	,,	21 Aug. **1824.**
29,	15		15		,,	4 Sept. **1824.**
30,	13	Vol. VII, pp. 1–56	15	,, iv, ,, 187 f.n.	,,	13 Nov. **1824.**
31,	16		15		Bibl. Franç.,	25 Dec. **1824.**
32,	16		15		,,	19 Feb. **1825.**
33,	15		15		,,	14 May **1825.**
34,	15		15		,,	18 June **1825.**
35,	15		18		,,	30 July **1825.**
36,	29	–506	10		,,	3 Dec. **1825.**

[The sheeting of the French records is a mystery to both of us.]

MIMOSES :—T.P. 1819 ; pp. 233.

Livr. 1,	3½ sheets, pp.	1–4,	5 pls.	Bibl. Franç.,	12 June **1819.**
2,	3	5–16,	5	,,	25 Sept. **1819.**
3,	3	17–28,	5	,,	18 Dec. **1819.**
4,	3	29–40,	5	,,	22 Ap. **1820.**
5,	3	41–52,	5	,,	29 July **1820.**
6,	5	53–72,	5	,,	15 Dec. **1820.**
7,	3	73–84,	5	,,	15 June **1821.**
8,	3	85–96,	5	,,	3 Nov. **1821.**
9,	3	97–108,	5	,,	12 Jan. **1822.**
10,	3	109–120,	5	,,	20 July **1822.**
11,	5	121–140,	3	,,	26 July **1823.**
12,	5	141–160,	5	,,	24 Jan. **1824.**
13,	6	161–184,	2	,,	15 May **1824.**
14,	10	185–223,	2	,,	3 July **1824.**

SYNOPSIS PLANTARUM.

Tom. I,	31½ sheets.	Bibl. Franç.,	14 Dec.	**1822.**
II,	33¾	,,	19 Ap.	**1823.**
III,	31¼	,,	6 Mar.	**1824.**
IV,	33½	,,	4 Feb.	**1826.**

Révision des Graminées:—I, T.P., 1829. II (plates), T.P. dated 1835.

Livr. 1,	5 sheets,	pp. 1–16,	5 pls.	Bibl. Franç.,	14 Feb. 1829. 21 Feb. 1829.
2,	4	17–32,	5	,,	11 Ap. 1829.
3,	4	33–48,	5	,,	2 May 1829.
4,	4	49–64,	5	,,	6 June 1829.
5,	4	65–80,	5	,,	4 July 1829.
6,	4	81–96,	5	,,	22 Aug. 1829.
7,	4	97–120,	5	,,	19 Sept. 1829.
8,	[4]	121–136,			
9,	4	137–152,	5	,,	14 Nov. 1829.
10,	4	153–168,	6	,,	12 Dec. 1829.
11,	4	169–184,	5	,,	30 Jan. 1830.
12,	4	185–200,	5	,,	13 Feb. 1830.
13,	4	201–216,	5	,,	13 Mar. 1830.
14,	4	217–232,	5	,,	27 Mar. 1830.
15,	5	233–252,	5	,,	8 May 1830.
16,	5	253–272,	5	,,	5 June 1830.
17,	5	273–292,	5	,,	12 June 1830.
18,	4	293–308,	5	,,	10 July 1830.
19,	4	309–324,	5	,,	14 Aug. 1830.
20,	4	325–340,	5	,,	31 Aug. 1830.
21,	4	341–356,	5	,,	27 Nov. 1830.
22,	4	357–374,	5	,,	11 Dec. 1830.
23,	4	375–386,	5	,,	25 Dec. 1830.
24,	3	387–398,	5	,,	12 Feb. 1831.
25,	3	399–410,	5	,,	26 Feb. 1831.
26,	3	411–422,	5	,,	18 June 1831.
27,	3	423–434,	5	,,	25 June 1831.
28,	3	435–446,	5	,,	23 July 1831.
29,	3	447–458,	5	,,	6 Aug. 1831.
30,	3	459–474,	5	,,	17 Sept. 1831.
31,	3	475–486,	5	,,	22 Oct. 1831.
32,	3	487–498,	5	,,	12 Nov. 1831.
33,	3	499–510,	5	,,	10 Dec. 1831.
34,	3	511–522,	5	,,	31 Dec. 1831.
35,	[Counted as issued with 40]				
36,	3	523–534,	5	,,	5 May 1832.
37,	3	535–546,	5	,,	26 May 1832.
38,	3	547–558,	5	,,	9 June 1832.
39,	3	559–570,	5	,,	23 June 1832.
40,	8	571–578 (& T.P.)	10	,,	14 July 1832.
41, 42, 43, 44,	24½	579–end,	21	,,	22 Mar. 1834.

C. Davies Sherborn.
B. B. Woodward.

[The following notes on the dates of publication of the botanical portions of some French voyages, contributed by the same authors to the *Annals and Magazine of Natural History* for April last, may be appended to the above paper.]

'Voyage aux Indes orientales . . . . pendant . . . . 1825–29, publiée . . . . par M. C. Bélanger.'

Botanique.

Livr. 2 & 3 were issued in 1834 (Bibl. Franç.), but apparently consisted of plates and wrappers. The "Cryptogamie," by Bélanger and Bory de St. Vincent, according to Pritzel, seems to have been issued in 1846.

‘Voyage au Pôle Sud et dans l’Océanie sur les Corvettes l’Astrolabe et la Zélée, exécuté . . . . pendant . . . . 1837–40, sous le commandement de M. J. Dumont d’Urville,’ &c.

Botanique. 2 vols.
I. Plantes cellulaires. **1845.** Bibl. Franç. 16 Aug. 1845.
II. Plantes vasculaires. **1853.** Wiegmann, Archiv, 1855, ii. 372.

Géologie. The Atlas of Geology, which was issued in **1847** (Bibl. Franç. 23 Jan. 1847), contained 5 pls. of fossils named by Orbigny—they are “nomen et figura,” since no descriptions were published.

‘Voyage autour du Monde exécuté pendant . . . . 1836 et 1887 sur . . . . ‘la Bonite,’ commandée par M. Vaillant,’ &c.

Botanique. Par M. Gaudichaud.
Introduction. 8vo. **1851.**
Explication et description des planches de l’Atlas par C. d’Alleizette. 186 pp. **1866.**
Cryptogames. 355 pp. **1846.** Bibl. Franç. 7 Nov. 1846.

Note.—The whole of the Cryptogams appeared in 1846; Montagne, in the preface, says that the complete MS. was sent to the editor in Dec. 1843, that some proofs were sent by him to Berkeley in 1844, who published extracts therefrom; but the work was not issued till **1846.**

Atlas. 150 pls. [**1846–49**?]

‘Voyage autour du Monde . . . . sur . . . . la Coquille pendant . . . . 1822–25 . . . .’ Par L. J. Duperry, &c.

Botanique.

Livr.	1.	6 sheets.	Crypt. pp.	1– 48.	Bibl. Franç.	12 Sept. **1827.**
	2.	6		49– 96.		26 Dec. **1827.**
	3.	5		97–136.		16 Feb. **1828.**
	4.	8		137–200.		3 Jan. **1829.**
	5.	6		201–250.		8 Aug. **1829.**
	6.	6½		251–300.		14 Nov. **1829.**
	7.	5	Phan.	1– 40.		1 Aug. **1829.**
	8.	6		41– 88.		2 Apr. **1831.**
	9.	2		89–104.		2 July, **1831.**
	10.	4		105–136.		10 Mar. **1832.**
	11–14.	8¼		137–200.		12 July, **1834.**

‘Voyage autour du Monde . . . . exécuté sur l’Uranie et la Physicienne, pendant . . . . 1817–20 . . . .’ Par M. L. de Freycinet.

Botanique. Par M. C. Gaudichaud. Algæ, by Agardh; Fungi, by Persoon.

Livr.	1. 6 sheets,	pp. 1– 48.	Bibl. Franç.	25 Oct. **1826.**	Fér. Bull. xi. 1827, 429.
	2. 5	49– 88.		27 Dec. **1826.**	
	3. 5	89–128.		24 Feb. **1827.**	
	4. 5	129–168.		13 June, **1827.**	Ibid. xii. 233.
	5. 6	169–216.		12 Sept. **1827.**	Ibid. xiii. 1828, 75.
	6. 6	217–264.		23 Feb. **1828.**	Ibid. xiii. 1828, 418.
	7. 6	265–312.		16 Aug. **1828.**	Ibid. xx. 97.
	8. 6	313–360.		27 Dec. **1828.**	
	9. 4 (? 5)	361–400.		18 July, **1829.**	
	10. 4	401–432.		12 Sept. **1829.**	
	11. 4	433–464.		28 Sept. **1829.**	Ibid. xxiii. 73.
	12. 7½	465–522.		6 Mar. **1830.**	

BOTANICAL EXCHANGE CLUB REPORT, 1899.

[The following are among the more interesting notes published in the above-named Report, which was issued on March 28, and is edited by the Rev. W. R. Linton, the distributor for 1899.—Ed. Journ. Bot.]

Ranunculus scoticus Marshall. Traheen's Lough, Achill Island, W. Mayo, 23rd June, 1899. Just my Scotch *petiolaris*, and growing in a similar situation, on the stony margin of the lake. It seems to fruit much more freely than *R. Flammula.* The first certain record for Ireland.—E. S. Marshall. "Herr Freyn (*B. E. C. Rep.* 1898, p. 564, 1900) refers this to Wallroth's var. *angustifolius* (*Sched. Crit.* 1822, p. 288). I cannot agree with him. I have grown the plant for several years side by side with a form of *Flammula*, and the specimens grown by me and seen by me in no way agree with Wallroth's description. See note in *Ann. Scot. Nat. Hist.* 1894, p. 51. The variability of *R. Flammula* is, I know, great, but I am inclined to think *scoticus* a subspecies."—A. Bennett.

Arabis ciliata R. Br. var. *hispida* Syme? Origin, Cong, E. Mayo; garden, Milford, 6th July, 1899. This is the only *Arabis* that I have observed on the limestone about Clonbur and Cong, whence I originally brought roots during the winter of 1894–5. It has since seeded and spread freely in my garden, keeping remarkably constant. The stem-leaves are not auricled, but truncate, and it seems different from our *A. hirsuta* of S. England, agreeing better with book descriptions of *A. ciliata* var. *hispida* Syme, of which I have not seen authentic specimens. If this suggestion proves to be correct, no doubt a good deal of Irish (probably also of Scotch) *A. hirsuta* will rank with it. The differences from typical *hirsuta* appear to be rather subspecific than specific.—E. S. Marshall. "We consider this is *A. hirsuta*, which is distinguished from *A. ciliata* and its var. by the root-leaves being more stalked, the pods longer and narrower, and the seeds (fourteen to the inch) more scattered. These features are conspicuous in Mr. Marshall's plant." E. F. L. and W. R. L.

Erophila virescens Jordan (capsulis angustioribus). Milford, Surrey, 3rd and 17th April, 1899. This whitlow grass, which I have observed about Milford for several years, agrees well with Jordan's type-specimens, figure, and description of his *E. virescens*, except in having narrower capsules with a more wedge-shaped base. It is remarkable for its *bright* green, fleshy, glabrescent leaves, usually appressed to the ground in a regular rosette, and is a very pretty little plant. I believe it to be a good and perfectly distinct species, well apart from *E. præcox.*—E. S. Marshall.

Buda media Dum. var. *glandulosa* mihi. Hay Cliffs, Dover, Sept. 1899. This curious variety of *B. media* grew on the bare chalk cliff of Hay, Dover, probably on a slightly more impervious band, in District 7 of the *Flora of Kent*, where this plant is referred to on p. 67. It was originally referred to in the *Phytologist*, n. s. vol. v. p. 33; but the authors of the *Flora of Kent* say that the station seems an unlikely one for *B. media* or *B. marina*, and they would not be surprised if it proves to be *B. rupestris*. As a matter of fact, the specimen belongs to *B. media*, but it differs from the type not only in its place of growth, but in having a woody rootstock; and the pedicels, instead of having glabrous calyces, are distinctly glandular.

Geranium purpureum Vill. Dry sunny banks, St. Ouen's, Jersey, 21st May, 1899. This plant seems to correspond well with the very full description of *G. purpureum* Vill. in Lowe's *Flora of Madeira*, except that the carpels are downy, whereas Lowe describes them as smooth. The Rev. R. P. Murray tells me that it is exactly the form which is abundant in Portugal. It is distinguished from *G. Robertianum* L. by (1) the erect habit; (2) the absence of the villous hairs, and consequently of the very characteristic odour of *G. Robertianum;* (3) the smaller size of the parts of the flower. What relation does this bear to the *G. purpureum* auct. angl. of the *London Catalogue?* In Brébisson's *Fl. de Normandie* two species (besides *G. Robertianum*) are given: (1) *G. minutiflorum* Jord. = *G. purpureum* Vill. pro parte, of which *G. modestum* Jord. is put down as a variety; (2) *G. Lebelii* Bor., the description of which will not fit the Jersey plant. In the *Student's Flora, G. purpureum* Vill. = *G. modestum* Jord. = *G. Lebelii* Bor., and according to Reichenbach *G. Raii* Lindl. also = *G. purpureum* Vill., though English authorities seem to regard it as a "shaggy" maritime form of *G. lucidum* L. In Smith's *English Flora, Geranium lucidum saxatile, foliis Geranii Robertiani* (an excellent description of the Jersey plant) is given as a var. of *G. Robertianum* L. Can anyone disentangle these synonyms? In Lloyd's *Flore de l'Ouest de la France, G. purpureum* Vill. is the only species given besides *G. Robertianum*, and it is made to include *G. modestum* and *G. minutiflorum* Jord.—L. V. Lester. "This is the plant we call *purpureum* in Britain. It differs from *G. purpureum* Vill. in having downy carpels."—E. F. Linton. "*G. purpureum* Vill. is distinguished from *G. Robertianum* by its shorter and narrower petals, and its carpels being more closely or thickly rugose. *G. modestum* Jord. is a form of *G. purpureum* with a less hairy calyx. *G. minutiflorum* Jord. is a southern maritime var. of *G. purpureum.*" W. R. L.

Rosa pimpinellifolia × canina = *R. hibernica* Sm. var. *glabra* Baker. Hedges near Hoylake, Cheshire, 5th August, 1899. I am not at all sure that I ought not to have labelled these *R. pimpinellifolia × glauca.* In either case it is a good example of how a hybrid may exceed either or both of its parents in frequency. I saw only three or four plants of *R. pimpinellifolia* L., and those not within a quarter of a mile of the hybrid, but I only searched a portion of the coast sandhills, where it probably grows. *Canina* forms were also few, and I saw no *glauca* or *subcristata* at all, though the latter is stated to be frequent in the district in the *Flora of Cheshire.* The hybrid is so abundant as to fill many of the hedges, and, except one bush of *R. Doniana*, or possibly *R. Robertsoni*, it belongs exclusively to the var. *glabra*. Its hybrid origin is already shown by the universally abortive fruit.—A. H. Wolley-Dod. "I quite agree in this naming. The tendency to reflexed sepals in some of the fruits points to *R. canina* rather than *R. glauca* as the second parent. The glabrous leaves, with here and there compound serrations, and a few glands on the petiole, suggest *R. dumalis* as the *canina* form." E. F. Linton.

R. dumetorum Thuill. Glebe hedges, Knighton, Radnor, 8th August, 1899. M. Crépin writes of this: "I do not think that this form belongs to the *coriifolia* group, although its sepals are ascending. Its styles are not woolly as in *R. coriifolia*, and, besides, its general facies is not that of the latter. Perhaps one should see in this form a variety of *R. canina* of a group near *R. dumetorum*, with teeth often a little glandular. *R. implexa* has the leaflets glabrous, excepting the midrib." I had suggested the alternative names, *R. coriifolia* Fr. or *R. implexa* Gren., to M. Crépin, on account of the (usually) strongly ascending sepals, but his comment on this character in many examples is often "sépales redressés accidentellement," so it appears that that character is not to be relied on.—A. H. Wolley-Dod.

Myosotis versicolor Reichb.? var. *pallida* Brébisson. This variety is common on dry banks in Jersey, April and May, 1899, and is very consistent in colour, though variable in habit. The points of distinction are—(*a*) foliage a yellower green; (*b*) calyx never tinged with purple; (*c*) flowers pure white, never yellow, never shading off into, or turning, blue. It appears to differ from *M. Balbisiana* Jord., the flowers of which are yellow, and from *M. dubia* Arrondeau, the flowers of which are white, but turn blue. In Brébisson's *Flore de Normandie* two other varieties are given: (1) var. *pallida*, flowers white or very slightly yellow; (2) var. *elongata*, "stems weak, little branched, elongate. Flowers yellowish, then reddish, very small." The Jersey plant seems to correspond with var. *pallida*. In *Journ. Bot.* 1893, p. 266, a "white variety with paler foliage" is mentioned as found in the Scilly Islands.—L. V. Lester. "Is this variety of *M. versicolor* more than an albino form which would have, in addition to white flowers, foliage of a paler hue?"—E. F. Linton.

Poa trivialis L. var. *glabra* Döll, *Rhein. Fl.*, p. 92. In Bloxham Grove, near Banbury, Oxfordshire, June, 1899. This plant is contained in the British Museum Herbarium under the name of *P. pratensis*, coll. A. French, 1878, but the specimens there suggested to me, at a cursory view, a form of *P. nemoralis*, but the ligule did not agree. French evidently saw that it was abnormal, and he remarks that it was the prevailing grass in the Grove. This grove is a circular spinney, planted probably in an old stonepit; but the trees have gone from the centre, and it is now open to cattle, who evidently make it a resting-place, since the grass was so trampled down as to render it impossible to obtain good specimens. Prof. Hackel agrees with me in referring them to this variety of *P. trivialis*.—G. Claridge Druce.

SHORT NOTE.

SCAPANIA CRASSIRETIS *Bryhn* IN BRITAIN.—Among a collection of hepaticæ made in Perthshire by Mr. P. Ewing in July, 1900, was one which I had little doubt was this species. The locality was Ben Heasgarnich, on a wet rock at 3200 ft. alt. The plant differed considerably in appearance from a series of Norwegian specimens in my possession, being shorter and rather stouter. I sent specimens to Herr Kaalaas, who confirms the name. He writes: "The result of my examination is that it really must belong to *S. crassiretis* Bryhn, although it differs in some degree in habit and size from Norwegian specimens of the plant. The essential characters, however, are quite the same." This species was first described by Bryhn in *Revue Bryologique*, 1892, p. 7. There is also a description of it in Kaalaas' *De Distrib. Hep. in Norveg.*, 1893, p. 248. It has hitherto been only known from Norway, where it is apparently nowhere common, but has a wide distribution, occurring also on the west coast among Atlantic species. It is a slender and, typically, an elongate plant, forming compact reddish-brown tufts on wet alpine rocks. The antical lobe of leaf is half the size of the postical, obliquely cordate or reniform, incumbent, widely crossing the stem, margin entire, with obtuse apex, cuticle verruculose. *S. purpurascens* is the only plant which might be mistaken for it in the field, but the antical lobe is of a different shape, not or seldom crossing the stem, and is usually denticulate; it is also generally of a brighter reddish colour. The lax form of *S. resupinata*, as it occurs on our hills, has a considerable resemblance to it, but in this state it does not grow on wet rocks, but on rock ledges or grassy banks among other species and mosses. It does not form compact tufts in those positions, and the antical lobe is dentate. The only other species occurring on the hills with any resemblance to it is *S. æquiloba*, but in this the antical lobe is not incumbent, and the apex is acute; it also does not occur on wet rocks. *S. nemorosa* and *S. aspera* need not be considered in the field in this connection, as they are, at least in Scotland, exclusively low-ground plants. Under the microscope *S. crassiretis* can be distinguished from its allies by its cell structure. The cell-walls are greatly incrassate, the lumen being stellate, and the trigones very conspicuous. This stellate appearance seems to be constant, and is a marked feature. Flowers and fruit of this species are unknown.—SYMERS M. MACVICAR.

NOTICES OF BOOKS.

Disease in Plants. By H. MARSHALL WARD, Sc.D., F.R.S. Macmillan & Co. 8vo, pp. xiv, 309. Price 4s. 6d.

THERE are already before the public a number of books that treat of the diseases of plants. The present work does not compete with these, but, as the title indicates, deals rather with the plants themselves in health and disease, and how they react to external conditions. The book has been compiled, the author tells us in the preface, to meet the wants of a general public of agriculturists and cultivators who wish to understand something of the nature of the plants with which they are dealing, and of the maladies by which these are attacked, but who have no desire to know minute details of histology or the life-history of the fungi or insects that cause disease. They are, he considers, in the position of the laity who know the danger of being wholly ignorant of disease, but who willingly leave expert knowledge to the professional man. It is questionable how far Prof. Marshall Ward is right in condoning such ignorance, for it is just the life-history of the disease-causing organisms that the agriculturist requires to know, in order that he may apply a suitable remedy at the right season. How can he properly deal with rusted wheat, unless he knows that he must also have an eye on the barberry; and how is he to fight finger-and-toe without understanding that the spores of *Plasmodiophora* remain in the soil ready to begin their life-cycle again in some *Brassica?*

The first section of the book is entitled "Some Factors," and gives an account of the life and development of the normal plant. A discussion of the biology of the soil is included, and the bearing of man's interference on cultivated plants as regards selection and hybridization. The whole section is full of interest and suggestion, though necessarily, from want of space, many points of interest are merely indicated.

The second and larger part of the book deals with disease, which is defined as "variations of functions in directions or to extents which threaten the life of the plant," or, further, whatever causes the "premature death of the plant." The Professor deals in turn with the many risks the plant has to encounter before it reaches maturity. The causes, the nature, and symptoms of disease are passed in review, and a sketch is given of various malformations and monstrosities. A printer's error on p. 245 makes "frugiferous" bats responsible, in the tropics, for the bare condition of the branches termed *stag-head.* The concluding chapters discuss the nature of protoplasm, with special reference to the life and death of plants.

A short historical sketch of each subject adds greatly to the interest of the work, and a carefully chosen bibliography is appended to each chapter; but it seems a pity that all illustration has been dispensed with, especially where description is necessarily short. Professor Marshall Ward demands from his readers a fair knowledge of botany in order to follow his arguments—a more extensive knowledge than the ordinary cultivator possesses or is likely to possess. Unless the Professor anticipates the day when—if it may be allowed to travesty Plato—"agriculturists will be philosophers, and philosophers will be agriculturists." A good glossary of the technical terms used in the book would be of great service, and might with advantage be added in a subsequent edition; so valuable a work should be made available to as large a circle of readers as possible.

A. L. S.

Isle of Man Botany.

The Rev. S. A. P. Kermode has published in the Manx *Yn Lioar Manninagh* (vol. iii. pp. 273–291, 1900) a list of the "Flowering Plants" of the island. In his prefatory note the author hopes "that the list is now tolerably complete." Nothing is said of any continuation, but at present it only extends to the *Naiadaceæ.* "In arrangement and nomenclature Hooker (*Student's Flora*, 3rd edition, 1884) has been followed throughout; no specific localities are given, except in the case of the rarer plants."

Mr. Kermode gives a list of the various authorities quoted, among them Watson's *Topographical Botany*, but he has overlooked twelve species there recorded, nor does he include sixteen species recorded in this Journal and in *The Naturalist;* but as a set-off against these he records thirty-eight species not given in *Top. Bot.* Of these, *Raphanus maritimus* (this is called "Wild Radish"), *Viola lactea*, *Ulex nanus*, all the *Rubi*, *Cicuta*, *Œnanthe pimpinelloides*, *Calamintha Nepeta*, and *Juncus compressus* will need to be confirmed. No doubt the "*Viola lactea*" is really *V. canina* L. (*V. ericetorum* Schrad.), and "*V. canina*" *V. sylvestris*. *Ulex Gallii* is recorded by Babington, not *nanus*. The *Œnanthe* is no doubt *Lachenalii*, which, however, is also given (from "Forbes cat."). Many of the other additional species given are probably correct, and may be accepted on distributional grounds. The almost entire absence of alpine species where the hills (in at least one instance) exceed 2000 ft. is somewhat remarkable. *Epilobium alsinefolium* is given from two localities; this descends in the north of Scotland to 450 ft. (Marshall). *Juncus compressus* is probably *J. Gerardi.*

It is a great disappointment to find no Manx names for the plants; of the English names given some are wrongly applied—for example, *Prunus avium* is called "Bird Cherry"; this, the Latin name notwithstanding, is popularly applied to *P. Padus*; and *P. avium*, called "Wild Cherry" or "Gean" in England.

The following species may be added to the list on the authority of Mr. P. G. Ralfe, of Castletown:—*Raphanus Raphanistrum*, *Arenaria serpyllifolia*, *Hypericum perforatum*, *Saxifraga granulata*, and *Cerastium triviale.*

Mr. Hiern, whose notes in this Journal for 1897 are referred to, will be somewhat surprised to find "the Rev." prefixed to his name!

Arthur Bennett.

Prodromi Floræ Britannicæ Specimen adumbravit F. N. Williams, F.L.S. (Cucurbitaceæ, Lobeliaceæ, Campanulaceæ, et Asteracearum subfam. Asterinæ.) Obtainable at 181, High Street, Brentford. Price 1s. by post.

It is pleasant to notice a fresh and independent attempt to show the way how to produce at least a foretaste of a new British flora. In an introductory article, consisting of two pages, Mr. Williams explains and defends the scope and plan of the work. Careful attention has been paid to systematic arrangement and nomenclature, and the system of Engler and of the modern German botanists has been adopted, in preference to that of Jussieu, De Candolle, or Bentham and Hooker. Characters are not supplied for the classes, families, or genera, but abundant references to standard authors are quoted; in *Compositæ* (called *Asteraceæ*) a table shows the disposition of the genera in series, subfamilies, tribes, and subtribes, and, together with some original matter, characters are given for the various groups subordinate to the series. All the species are critically described in Latin; "the Latin style used is that of the nominative absolute with separate sentences, instead of the frequently used ablative in a single long sentence broken up by semicolons." But might not the accounts of British plants have been rendered in the English language?

Proper precision has been applied in the employment of the terms used to express the different forms of pubescence and the various shades of colour; this precision and the correct citation and description of varieties are useful features of the scheme, which extends over sixteen octavo pages, and embraces thirty species in fifteen genera. Tournefort and Jussieu and other of the older botanists, though not earlier than 1700, are cited for the genera, so far as the names are adopted; in the case of less ancient authors, however, a different style or standard is followed; as an instance, on page 16, for *Anaphalis* the original authority of Aug. P. De Candolle is dropped out, notwithstanding the fact that the species comprehended by its author are still meant to be retained in it; the extension, by which several other species are supposed to be included, and which involves some modification of the characters, ought not to ignore the work of the first proposer.

Synonymy in the case of the species has been rigorously excluded, except for that which has received a new name, namely, *Inula vulgaris* Williams, the plant which Linnæus called *Conyza squarrosa*. With regard to this the author in a note (page 14) apologizes as follows:—"In proposing this name for the Linnean plant, I have followed S. F. Gray and St. Lager in discarding a specific name which is identical with that of a closely allied genus, in which the two parts of the binomial would be incompatible, as illustrated in *Inula Conyza* Cand., under which name the species is commonly indexed. *I. vulgaris* Trev. is *Pulicaria vulgaris* Gärtn.; and the specific name of "squarrosa" is not available, as Linnæus has also described an *I. squarrosa*. No other synonyms for the plant under its present genus are recorded in *Index Kewensis*, which is the excuse for proposing the present name, suggested by Bauhin's name for the plant, *Conyza major vulgaris*."

The style of Linnæus has been followed in treating the generic name of *Erigeron* as of the neuter gender, although classical usage regards the noun as masculine. The abbreviation for De Candolle which Mr. Williams adopts is *Cand.*, an improvement on the more customary *DC.*

The localities and distribution of the less common species are briefly given, and for each species the station which it usually affects is added, with an English name at the end; these and the introductory and foot notes are the only parts written in English. The original British habitat, Shute Common, Devon, is duly recorded for *Lobelia urens* L., and this neighbourhood is stated to be the only station for the species in Britain; no reference, however, is made to the Cornish record satisfactorily recorded in this Journal for 1883, p. 359, by the late T. R. Archer Briggs. The law of priority is disregarded in continuing to prefer the name *Wahlenbergia* Schrad. (1814) to *Cervicina* Delile, *Fl. Egypte*, p. 150 (1812).

An example of "the few additions likely to ensue with the diminishing area of unturned soil" occurs in the inclusion (page 11) of *Aster salignus* Willd., found in Wicken Fen, Cambridgeshire, in 1867, "a patch of undrained soil, where it is possible that it is native."

On the scale of this specimen sheet, the whole British flora would occupy about a thousand pages, or sixty such sheets; and it is to be hoped that Mr. Williams himself will enrich our literature with its continuation and completion.

W. P. HIERN.

ARTICLES IN JOURNALS.*

Bot. Gazette (15 April).—C. S. Sargent, 'North American Trees' (*Cratægus, Betula, Cupressus*).—C. O. Townsend, 'Effect of Hydrocyanic acid gas on Grains.' — A. C. Life, 'Tuber-like rootlets of *Cycas*.'—N. B. Pierce, 'Walnut Bacteriosis.'

Bot. Notiser (häft 3: 15 May).—E. Adlerz, 'Nya Hieracium-former och Hieracium-lokaler' (5 pl.).—T. Hellund, '*Ribes rubrum*' (concl.).

Bot. Zeitung (16 April).—Graf zu Solms-Laubach, 'Cruciferenstudien' (1 pl.).

Bull. de l'Herb. Boissier (30 April). — H. Christ, 'Reliquiæ Weinlandianæ; eine Pteridophyten-Sammlung aus Deutsch Neu-Guinea.'— R. Buser, 'Les Alchémilles Bormiaises.'— F. Stephani, 'Species Hepaticarum' (cont.).—C. A. M. Lindmann, 'Beiträge zu den Aristolochiaceen' (2 pl.).

Bull. Soc. Bot. France (vol. xlvi: session extraordinaire à Hyères, 1899; received 18 May).—C. Gerber, 'Les fruits tri- et quadriloculaires de Crucifères.'— P. Dumée, 'Le sac embryonnaire des Orchidées' (2 pl.). — L. Legré, 'La Botanique en Provence au XVI^e^ siècle: Louis Anguillara, Léonard Rauwolff.' — E. Heckel, 'Le parasitisme des racines de *Ximenia americana*.'

Bull. Torrey Bot. Club (18 April).—H. J. Banker, 'Hydnaceæ.' —A. Nelson, 'New Plants from Wyoming.'—D. Griffiths, *Claviceps cinereum*, sp. n.—C. L. Shear, 'Mexican species of *Bromus*.'—R. J. Bennett, 'Teratology of *Arisæma*.'

Gardeners' Chronicle (27 April).—M. Foster, '*Iris Willmottiana*, sp. n.' (fig. 100).—(11 May). Sir George King (portr.).—Thomas

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Meehan. — (18 May). C. de Candolle, 'Proliferous leaves' (figs. 117–120).

Journal de Botánique ("Jan." & "Février"; received 26 April): "Mars" (received 16 May). — H. Hua & A. Chevalier, 'Les Landolphiées du Sénégal, du Soudan et de la Guinée française.' — C. Sauvageau, 'Les Sphacelariacées' (cont.). — ("Jan." & "Mars"). C. Gerber, 'Sur la respiration des Olives.' — ("Fév."). L. Guignard, 'La double fécondation dans le Mais.' — ("Mars"). H. Lecomte, 'Sur les graines de *Landolphia*.'

BOOK-NOTES, NEWS, &c.

At a meeting of the Linnean Society held on April 18th, Mr. W. B. Hemsley exhibited the leaves and flowers of two new genera of Chinese trees: (1) *Bretschneideria*, commemorating the eminent sinologue and botanist whose death has lately been announced, discovered by Dr. Henry in the province of Yunnan, lat. 23° N., in forests at an elevation of 5000 ft., and bearing pink and white flowers like the horse-chestnut, to which it is related; and (2) *Itoa*, also a native of Yunnan, growing at a similar elevation and to a height of about twenty feet; this genus, named in honour of a famous Japanese botanist, was stated to be allied to *Idesia* Maxim., *Poliothyrsus* Oliver, and *Carrierea* Franch., all monotypic genera inhabiting China, but differing from them in certain respects which Mr. Hemsley indicated. Mr. Hemsley and Mr. H. H. Pearson communicated a paper on the Flora of Tibet, based on various collections of high-level plants received at the Kew Herbarium. The country dealt with was described as lying between 80° and 102° lat. and 28° and 29° long., and having an average altitude of 15,000 ft. Within this area 360 species of vascular plants had been collected, and were referred to 144 genera and 46 natural orders. Almost all the orders represented were nearly of world-wide distribution, and none were really local. Of the 360 species, only 30 appeared to be peculiar to Tibet. In illustration of the paper, a selection of the plants was exhibited; most of them dwarf deep-rooted herbs, very few annual or monocarpic, and the only woody plant, *Ephedra Gerardiana*, was described as scarcely rising above the surface of the ground. The majority had been collected at altitudes varying between 15,000 and 18,000 ft. Mr. C. B. Clarke pointed out that the name "Thibet" or "Tibet" was quite unknown to the people who dwelt in the country so-called, and its precise boundaries were even still imperfectly defined. It was convenient, however, to retain a name by which it was known to so many European travellers, and their explorations and collections were making us better acquainted with the country every day.

We are informed by Fellows of the Linnean Society who were present at the meeting on the 4th of April that the account of the proceedings given in our last number is incorrect. Mr. Hemsley, who is said to have exhibited specimens, was not present at the meeting, nor was Mr. H. H. Pearson, to whom, with Mr. Hemsley, the reading of a paper is attributed. We can only say that our account was taken from the official circular sent out to Fellows by the Linnean Society, which is thus entirely responsible for the misstatement.

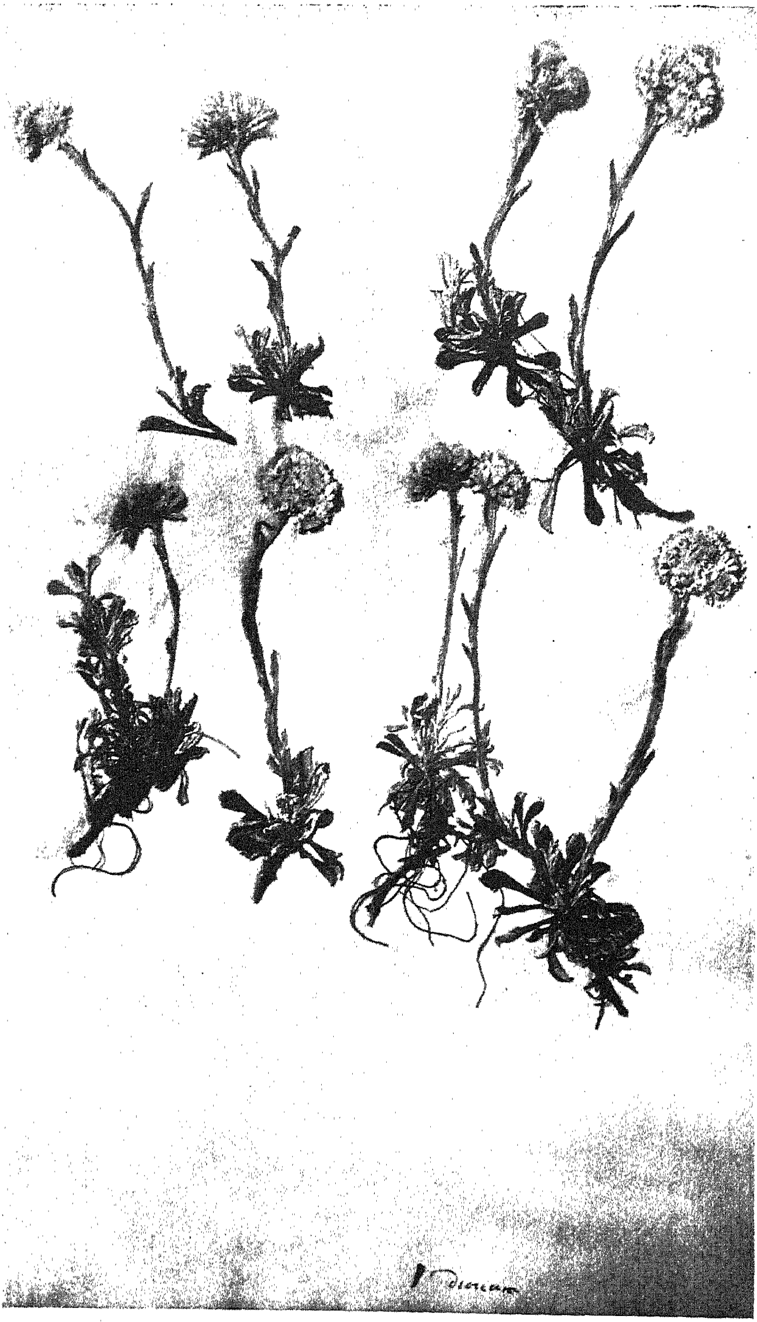
Mr. E. D. Marquand, who has for the last twelve years been collecting material for a Flora of Guernsey and the lesser Channel Islands—Alderney, Sark, Herm, Jethou, Lihou, Crevichon, and Burhou—announces that his work will be published this year by Messrs. Dulau & Co. at the subscription price of 8s. It will include the cryptogams, and somewhat unusual prominence will be given to plant-names and plant-lore. Each island is treated as a separate and independent botanical area, possessing its own peculiar features, and its own distinctive flora, for the islands differ much more widely than is commonly supposed, both from each other and from the adjacent portion of the French mainland.

The third volume (for 1900) of the *Meddlanden från Stockholms Högskolas Botaniska Institut* contains an important paper on the Spitzbergen flora by Messrs. G. Andersson and H. Hesselman. It is illustrated by plates and figures, some of which—*e. g.* those referring to forms of *Cochlearia*—have a special interest for British botanists. There are valuable additional notes on *Cerastium*, *Ranunculus*, and *Salix*; Dr. Lagerheim has several papers dealing with fungi, etc.; and there are other contributions from Messrs. Knut Bohlin, O. Borge, J. L. Lindroth, and O. Rosenberg.

Captain H. H. P. Deasy's *In Tibet and Chinese Turkestan*, "being the record of three years' exploration," has just been published by Mr. Fisher Unwin. The author acknowledges the help of Mr. E. G. Baker in preparing the botanical appendix; the plants collected by Captain Deasy have been placed in the National Herbarium, and named by Mr. Baker, Mr. Spencer Moore, and Dr. Rendle. The new species were described in this Journal for 1900, pp. 428, 495; to these may be added the description of a new variety (*Deasyi* Baker f.) of the polymorphic *Potentilla sericea*, of which the following description is given in Captain Deasy's book (p. 401):—"Planta cæspitosa; caules breves graciles erecti vel adscendentes; folia radicalia pinnata, foliolis approximatis parvis summis majoribus reliquiis decrescentibus oblongis vel ovato-oblongis lobatis vel grosse serratis, folia caulinia digitatim 3–5 foliolata. A dwarf plant, with radical leaves 2–3 cm. long; leaflets small, subsessile, green above, white tomentose below; terminal leaflet 5–6 mm. long; peduncles 1-flowered; petals 5, yellow, + 5 mm. long. Nearly allied to *P. sericea* L. var. γ *dasyphylla* Lehmann, Rev. Potentill. p. 34 (= *P. dasyphylla* Bunge)."

The part of the *Annuario del R. Istituto Botanico di Roma* (anno ix, fasc. 2°), just to hand, contains a paper by Prof. Pirotto and Dr. Longo on the structure of *Cynomorium* (with two plates); papers by Dr. Piccone on Red Sea algæ; and notes on the Calabrian Flora by Dr. Longo.

In response to suggestions, the useful *Key to British Hepaticæ* published in the May number of this Journal has been reprinted in pamphlet form, price 1s., and may be obtained from West, Newman & Co., 54 Hatton Garden, E.C.



Antennaria dioica (*specimina Linnæana*).

ANTENNARIA DIOICA VAR. HYPERBOREA CAND.

By Frederic N. Williams, F.L.S.

(Plate 423.)

If British specimens of *Antennaria dioica* are compared with a series of continental forms referred to the species, it will be seen that all the European forms may be grouped in three varieties, inclusive of the type; and that though intermediate forms may seem to occur, the length of the calathial stalks, the breadth of the basilar leaves, and the degree of pubescence on both surfaces of the leaves, sufficiently characterize the variety to which individual specimens may be referred. This paper is based on a critical examination of the material in Herb. Kew. and Herb. Mus. Brit.

That S. F. Gray was the first to describe and refer to its proper species the variety *hyperborea* has been generally overlooked in British floras and plant-lists; though, as the synonymy given further on will show, he cannot be quoted as the authority, on account of his unfortunate rejection of the jejune Linnean name in favour of the earlier trivial name used by Bauhin and Erndtel.

The grouping of the synonyms under each of the three varieties will best give their history in a concise form:—

ANTENNARIA DIOICA Gaertn. Fruct. Sem. Plant. ii. p. 410, t. 167, f. 3 (1791).

Var. α, TYPICA.

Syn.—*Pilosella minor* Fuchs. Hist. Plant. p. 606 (1542); Dodoens, Pempt. t. 68.
Gnaphalium montanum Bauhin, Pinax, p. 263 (1623); Erndtel, Viridarium Warsawiense, p. 53 (1730).
Chrysocoma humilis montana Morison, Hist. iii. p. 89 (1699).
Gnaphalium dioicum L. Sp. Pl. p. 850 (1753).
Gnaphalium dioiecium Hill, Herb. Brit. i. p. 36 (1756).
Elichrysum montanum Seguier, Pl. Veronens. suppl. p. 260 (1754).
Antennaria montana S. F. Gray, Nat. Arr. Brit. Pl. ii. p. 458 (1821).
Gnaphalium alpinum C. A. Mey., Verz. Pflanz. (1831).

VAR. β HYPERBOREA Cand. Prodr. vi. p. 270 (1837). Specimina majora. Rhizoma crassius, stolonibus brevius radicantibus. Folia aut utrinque lanata, aut subtus lanata suprà subaraneoso-pubescentia, tomento utrinque persistente (foliis adultis facie superiore interdum subglabrescentibus); basilaria latiora obovato-spathulata patentiora. Periclinii squamæ latiores obovatæ magis obtusæ. Calathia brevius pedicellata, in capitulum corymbosum simplex disposita.

Syn.—*Gnaphalium hyperboreum* J. Donn, Hort. Cantab. ed. 7, p. 237 (1812).
Antennaria montana var. *lanata* S. F. Gray, Nat. Arr. Brit. Pl. ii. p. 458 (1821).
Gnaphalium dioicum var., Smith, Engl. Flora, iii. p. 414 (1825).
Antennaria hyperborea D. Don in Engl. Bot. Suppl. t. 2640 (May, 1830).
Gnaphalium boreale Turcz. herb. (1835), ex Cand. Prodr. vi. p. 270 (1837).
Antennaria dioica var. *australis* Griseb. Spicil. Fl. ii. p. 198 (1844).

Var. γ CONGESTA Cand. Prodr. vi. p. 270 (1837). Specimina nana, quam in typo minora. Caulis 30–36 mm. Folia juniora utrinque albo-tomentosa. Calathia inter folia congesta sessilia; in calathiis femineis, squamarum parte scariosa saturatius colorata.
Syn.—*Gnaphalium alpinum* Asso ex Cand. Prodr. vi. p. 270.

The species is generally distributed over Europe (Portugal perhaps excepted), across N. Asia, touching N. Persia, and reaching Japan. It is found on the N. American continent from Alaska to Labrador and Newfoundland, and from the Arctic Circle to S. California, where, according to N. L. Britton,* var. β is the prevailing form, var. α being occasionally met with.

In the British Isles the species is found on heaths, sandy pastures, and alpine rocks, from the sea-level up to 600 metres in the Highlands; and its earliest record is the year 1641.†

The references to *exsiccatæ* in the distribution of var. *hyperborea* in the following paragraphs are worked up from the material in Herb. Kew.:—

Var. β *hyperborea*.—Of this plant D. Don writes that it was "first observed by the late Mr. John Mackay on Breeze Hill, Isle of Skye, in 1794. Sir J. E. Smith has noticed it in *English Flora* as a variety of *A. dioica*; but after many years' observation, and an attentive comparison of it, cultivated together with *A. dioica* and *A. plantaginea*, I am now fully satisfied of its being entitled to rank as a species." Smith's previous reference to it is as follows:—"A very fine variety, almost twice the size of the common sort, with the upper surface of the leaves downy, at least while young, was gathered on Breeze Hill, in the Isle of Skye, by the late Mr. John Mackay, which some have thought a new species. But it seems a mere variety, becoming still larger in a garden, and having, as far as I can make out, no specific mark of distinction."

In H. C. Watson's herbarium there is a single specimen, poor and scarcely characteristic, from Churchill Babington, found at Loch Coriskin, in the Isle of Skye, in September, 1838. In Borrer's herbarium there is also only a single specimen, from Skye, probably gathered in 1819, as it bears Winch's original label on which he has written "*Gnaphalium hyperboreum.*" This has an historical interest, as either this particular specimen or one from the same gathering was sent by Winch in 1819 to De Candolle for examination, and is the type for the variety described in the *Prodromus*.

---

* Ill. Fl. Un. States & Can. ii. p. 398.

† Johnson, *Mercurius Botanicus*, ii. p. 22.

On the continent of Europe var. β is more widely distributed than is usually indicated in floras; and, as the following specimens cited show, it occurs in Switzerland, Hungary, Servia, Bulgaria, Montenegro, and Turkey, also in Denmark, and the island of Bornholm in the Baltic Sea, as well as in the Daghestan territory of the province of Cis-Caucasia.

Exsicc. Alpe di Flühe, near Zermatt (*Robert Brown*, 1827); Ganes, on Mt. Magura, Transsylvania (*Czecz*, 1874); Transsylvania (*Schur*, 1870, no. 2016 *b*, forma purpurea elegantissima); a specimen labelled "*Gnaphalium australe*" (*Adamovic* exs. Serbicæ, 1897); Mt. Kopaonik (*Friedrichsthal*); Mt. Peristeri (*Grisebach*); Mt. Chortiasch (*Friedrichsthal*); Mt. Despoto-dagh, in Turkey, near Karlova (*Friwaldzky*); Montenegro (*Baldacci*, It. Albanicum, vi. no. 221, 1898); Mt. Hodja Balkan, in Bulgaria (ex herb. *Hooker*), labelled "var. *australis*"; a specimen from Daghestan, on the west bank of the Caspian Sea (*Becker*, 1877). There is also one of J. Mackay's original specimens from Dawson Turner's herbarium, labelled "*Gnaphalium* new, Isle of Skye"; and another labelled "Isle of Sky, Dr. Smith, 1806."

The following specimens from N. Asia should also be referred to var. β:—Specimens from Guriel, in Siberia (*Szowitz*), and from Alach-Jun and Krest-Judomiskoi (*Turczaninow*, 1835, "*Gnaphalium boreale*"), from Irkutzk, and Siberia Altaïca (1867); also Japanese specimens from Abashiri, in the island of Yezo (Pl. du Japon, 1890, no. 5456, *Faurie*).

In the British Herbarium of the Herb. Mus. Brit. there is a single sheet of var. *hyperborea* with six specimens attached. One from E. Forster's herbarium is not at all characteristic, as the upper surface of the leaves is almost glabrous. Two are garden specimens raised from a plant collected in the Isle of Skye (without date). Of the other three specimens, the most characteristic is one from Sowerby's herbarium, with a label attached in the handwriting of G. Don the elder, "I call this *Gnaphalium hyperboreum*; it was found by Mr. J. Mackay, Edinburgh, in the Isle of Skye. May this not be the variety mentioned by Lightfoot as being in Dr. Ross's collection?" What the date of this determination may be is uncertain; but the name, as stated above, was taken up (subsequently) by James Donn in 1812. On turning to Lightfoot's *Fl. Scotica*, ii. app. p. 1109 (1777), we find, "a variety of this, a foot high, was found near New Posso. *Mr. Yalden.*" Posso Craigs is a hill in Peeblesshire.

VAR. γ *congesta.*—This variety was founded on Asso's specimens, which he referred to *Gnaphalium alpinum*. Boissier's specimens, which agree with the type, were collected on the Sierra Nevada, in the south of Spain, at a height of 2550 metres, in ice-crevices, above Corral de Veleta. Among the Scottish specimens in Herb.

Kew. is one labelled "The Highlands," a dwarf form, with a stem barely 35 mm., which exactly agrees with the Spanish specimens on another sheet, and is quite distinct from either of the other two British varieties. On the evidence of this specimen, I think that var. *congesta* may be added to the Scottish flora, and possibly it may be found in lofty stations suitable for its growth, if diligently looked for. If this can be satisfactorily settled, it will be seen that all the three European varieties of *Antennaria dioica* are to be found in the Scottish Highlands.

The late Dr. F. B. White, in *Scottish Naturalist*, 1886, p. 323, and in *Fl. of Perthshire*, p. 180, has described a var. *pedicellata*, found at Glen Tilt and near Strowan Station, in which the calathia are not so close together, on pedicels from 12–28 mm., and, as he says, "probably only an extreme state, as intermediate forms occur." It seems indeed to be only a form slightly different from the type of the species, scarcely to rank as a variety. Among the specimens in the British Herbarium, the description seems to fit some specimens gathered by A. Croall in 1854 at Little Craigandhal, and labelled, "Plants of Braemar no. 105." In these, the calathia are spread out in a semicircle, owing to the greater length of the pedicels.

In the plate which accompanies this paper, the single sheet in the Linnean Herbarium, which contains eight specimens of *Antennaria dioica*, is reproduced by photography. At the bottom of the sheet is the word "dioicum" in Linné's handwriting. In three of the specimens rose-coloured scales are more noticeable; in three others no rose-coloured scales are to be seen. One specimen has two flowering stems.

SOME BRITISH VIOLETS.—II.

By Edmund G. Baker, F.L.S.

The Pansies growing in hilly or mountainous districts in this country can, with trifling exception, be arranged in two of the groups referred to in my previous paper (pp. 9–12). The representative species for these groups are *V. lutea* Hudson and *V. saxatilis* Schmidt* (*V. alpestris* Jordan). These groups have many points in common—the plants are perennials or subperennials, never annuals, as is generally the case with the groups of *V. arvensis* Murray and *V. tricolor* L. sensu stricto; the flowers are nearly always showy, the petals being always distinctly longer than the sepals, except in the case of *V. lutea* Huds. var. *hamulata*. The two groups differ in the stipules, which in the group of *V. lutea* are digitately multipartite or digitately pinnatifid, while in the *saxatilis* group they are pinnatipartite. Particular attention must also be paid to the character of the rootstock. In mountainous or hilly country in close proximity to the sea—as, for instance, in the west of Ireland—considerable difficulty is experienced in defining exactly the boundary between the group of *V. lutea* and the group of *V. Curtisii*. Mr. A. G. More, in this Journal for 1873, p. 117, when speaking of the Flora of Ireland, states that the sandhill pansies of the whole coast belong rather to *V. Curtisii*, except some plants he refers to growing near Lahinch and Miltown, in Co. Clare.*

---

* This species has not been recorded as growing in Britain, but is widely spread on the Continent.

Generally speaking, *V. Curtisii* is a plant of sandy sea-shores, and *V. lutea* of grassy places in hilly and mountainous regions; the former having short decumbent stems and short subterranean stolons, and in the latter the stems are either short or elongated, but ascending, and long, slender, subterranean stolons.

GROUP I.—Representative species *V. lutea* Hudson.

Perennials. Rootstock branched, branches slender, producing short or more rarely elongated ascending stems. Stipules of lowest leaves digitately multipartite or digitately pinnatifid. Petals generally longer than the sepals, spreading (except in the case of var. *hamulata* Baker).

The members of this group are found in grassy places in hilly and mountainous districts, very occasionally on sandbanks near the sea—as at Lahinch and Miltown, in Co. Clare.

V. LUTEA Hudson, Fl. Angl. ed. 1, p. 331 (1762), p. p.; Eng. Bot. t. 721 (1800). *V. grandiflora* Hudson, Fl. Angl. ed. 2, p. 380, p. p. *V. sudetica* Willd. *a lutea* DC. Prod. i. p. 302 (1824). It is unnecessary to give a detailed description of this well-known species. Hudson's plant, as the name implies, was yellow-flowered.

Var. AMŒNA Henslow, Cat. Brit. Plants, p. 3 (1829). *V. amœna* T. F. Forster in Symons' Synopsis, p. 198 (1798); Eng. Bot. t. 1287. *V. sudetica* Willd. var. *media* DC. *l. c.* The flower is thus described in the original description:—"Flos magnus saturate purpureus aut violaceus. Petala superiora obtuse ovata, purpurea; lateralia barbata purpurea, venosa, venis saturatius purpureis; infima magna, superiore parte lutea, venis purpureis notata; calcar breve, obtusum." It is described as from Scotland, where it was first found by Mr. Dickson. The plant from which the original description was taken cannot have had a particularly elongated stem, as it is described as being only half the length of the scape —*i. e.* "Scapus erectus canaliculatus caule duplo longior."

Gardiner (*Rambles in Braemar*, 1845, p. 18) gives nine grades of colour-variation which he states exist between this and *V. lutea*.

A very fine Violet grows on some of the Breadalbane Mountains, which bears close relations to *V. amœna* and to the *V. grandiflora* figured by Villars (Cat. Pl. Jard. Strasbourg, p. 288, tab. v. (1807)) —the *V. lutea* Hudson, var. *grandiflora* of Koch's Synopsis, ed. 2, p. 95. I have closely compared it with Villars' figure and with specimens from Schultz Herb. Normale no. 1019 (from granitic escarpments between Munster and Gerardmer, in the Vosges), which have been referred to this variety. Although, as just stated, it is closely allied, there are several differences, and I venture to describe it as a subvariety:—

---

* Specimens I have seen in Mr. Shoolbred's herbarium from sand-banks, Miltown, Co. Clare, approach very closely to the Pansy from Mullaghmore to which my father gave the name *V. Symei*.

Var. AMŒNA subvar. INSIGNIS. Perennial. Stem rather short or somewhat elongate (5–15 cm.). Lamina of lowest leaves orbicular, several times longer than the petiole, base rounded or subcuneate, margin crenate-serrate; lamina of upper leaves ovate-oblong or oblong, differing from our specimens of *V. lutea* var. *grandiflora* in several points—in the obtuse apex, longer petiole, and broader lamina; the petioles and lamina are more or less hairy. Stipules palmately pinnatifid; terminal lobe rather larger than the others. Peduncle 5–6 cm. long. Bracteoles placed below the curvature. Flower about the same size as that of var. *grandiflora*, but upper petals narrower. Sepals subacuminate. Upper petals divergent, narrow obovate, ± 1·8 cm. long, 8–9 mm. broad at broadest point—lateral petals spreading, lower petal rather broader than long, ± 1·3 cm. long, ± 1·7 cm. broad at broadest point. Spur just longer than the appendages of the calyx, not so long as in var. *grandiflora*. Capsule shorter than sepals.

Hab. South side of Craig Caillaich above Finlarig, in Breadalbane; and rocks, somewhat moist, at very considerable height on Ben Lawers, frequent, Aug. 1794, *Robt. Brown*, in Herb. Mus. Brit. Cliffs of Ben Lawers, *G. C. Druce*, Aug. 1888, Herb. G. C. Druce.

It is larger-flowered than typical var. *amœna*, and has, as has been stated, a stem sometimes 15 cm. long. The large size of the flowers (which are purplish) makes this a very striking plant.

I am unable to follow Messrs. Rouy and Foucaud in their description of *V. lutea* α *unguiculata*, for which they quote the following synonymy:—

"*V. grandiflora* Huds. Fl. Angl. ed. 2, p. 380; *V. lutea* var. *grandiflora* Koch, Synopsis, ed. 2, p. 95; G. et G. Fl. Fr. i. p. 185."

V. grandiflora Hudson, Fl. Angl. ed. 2, p. 380, has generally been considered synonymous with *V. lutea* Hudson, ed. 1, p. 331 *; but it should be noted that Hudson under *V. grandiflora* quotes *Viola caule triquetro simplici foliis oblongiusculis stipulis pinnatifidis* of Linnæus (Mantissa, p. 120), and *Viola montana lutea grandiflora* Bauhin, Pinax, 200, which are both placed by Linnæus (Mant. *l. c.*) under his *grandiflora*.

V. lutea Hudson α *unguiculata* Rouy & Foucaud is for the most part then synonymous with *V. lutea* Huds. var. *grandiflora* Koch, but is confused by these authors in their synonymy with *V. lutea* Hudson, Fl. Angl. ed. 1, p. 331. V. B. Wittrock, in his "Viola Studien," i. (in Acta Horti Bergiani, Band 2, No. 1, p. 96) describes and figures *V. grandiflora* Lin. Vill., but his fig. 107 on tab. vii. shows considerable difference in the character of the stipules from those organs as figured by Villars.

---

* *Confer* Smith, *English Flora*, p. 307; and Koch, *Synopsis*, ed. ii. p. 95 (1843).

Var. HAMULATA Baker, *North Yorkshire*, p. 207; Report Bot. Exch. Club, 1865, p. 7. The type of this plant was unfortunately destroyed by fire in 1864. It is said to bear the same relation to *V. lutea* that *V. arvensis* bears to *V. tricolor*; and is thus described in the Report cited:—

"Rootstock thread-like, perennial, wide-creeping. Stems diffuse, much branched at the base, slender, quadrangular, pubescent below, but the pedicels naked. Lower leaves on naked channeled stalks, about ¼ in. long, roundish, with ciliated crenations about as broad as deep, upper ovate, bluntish or even lanceolate, acute, with crenations two to three times as broad as deep. Stipules with the terminal lobe much larger than the others, leafy and toothed, the lobes all ciliated, the lateral ones two or three on each side, usually one only on the other, linear or subspathulate, entire, erecto-patent or sometimes curved like a sickle. Bracts three-quarters of the distance up the pedicel, minute, ovate acute, about the same width as the stalk. Sepals ⅜ in. long, lanceolate acuminate, slightly ciliated, the upper pair smaller, equalling the petals. Expanded corolla ⅝ in. deep by ½ in. across, petals all yellow, upper pair pale, obovate, 2 lines across, lateral pair smaller, deeper-coloured, with each a tuft of hairs at the throat, the lowest 4 lines, not marked with any lines or marked at the throat with three to five faint ones. Spur slender, curved upwards, barely one and a half times as long as the subquadrate bluntly toothed calycine appendages. Anther-spur linear-filiform, curved upwards, six to eight times as long as broad. The typical *V. lutea* has the terminal lobe of the stipules entire and less leaf-like, the lower petal when the plant is fairly developed ½ in., the lateral pair ¼–⅜ in., and the upper pair ½ in. across, so that the fully expanded corolla measures about 1 in. each way, and the spur keeled and thickened at the end, about twice as long as the deeply toothed calycine appendages."

Found on Richmond Racecourse, North Yorkshire; and, with *Thlaspi occitanum*, at the lead-mines on Copperthwaite Moor, near Reeth.

Other plants of this group not found in Britain, but found in France or Belgium, are—*Viola sudetica* Willd. (the type), *V. calaminaria* Lejeune, and *V. chrysantha* Schrader.

V. sudetica Willd. was quoted in *English Botany* as being synonymous with *V. lutea* Huds. Koch (in *Synopsis*, ed. ii. p. 95) describes a *V. lutea* Huds. var. *sudetica*, founded on *V. sudetica* Willd., and states that it differs from the type by being taller, having larger flowers, and petals often repand-crenate.

V. calaminaria Lejeune is a Belgian plant with yellow or yellowish, not very large flowers (2–2½ cm. long), and considered by some botanists as uniting *V. lutea* and *V. tricolor*.

V. chrysantha Schrader in Reichb. Fl. Germ. Excurs. ii. (1832), p. 709; Reichb. Ic. Fl. Germ. tab. 4516, is also believed by some botanists to be intermediate between *V. lutea* Huds. and *V. tricolor* L. (sensu stricto), but the plant as figured by Reichenbach has a longer spur than either of these species.

GROUP II.—Representative species *V. saxatilis* Schmidt (*V. alpestris* Jordan).

Perennials or subperennials. Stipules pinnatipartite, that is the middle lobe markedly different from the lateral lobes. Petals always longer than the sepals, spreading. Like the preceding, the members of this group are found in grassy places in hilly or mountainous country; they are allied on the one hand to the group of *V. lutea*, on the other to the group of *V. tricolor* L. (sensu stricto). As has been previously stated, the head-quarters of the group seems to be the Pyrenees, and it is only outlying members that have been recorded for this country.

The group may be subdivided either by the colour of the flowers, which seems to be more trustworthy here than in the group of *V. Curtisii*, or by the character of the median lobe of the stipule.

Certain species seem fairly constantly to have yellow flowers—as, for instance, *V. alpestris* Jordan and *V. Provostii* Boreau. Others are rarely, if ever, entirely yellow—as, for instance, *V. lepida* Jordan, in which the upper petals are obovate and of a beautiful cærulean violet.

It will be noted, however, that the members of this group cannot be rigidly placed in subdivisions by the colour of their flowers, and that the subdivisions to some extent overlap one another, as even here the coloration is subject to certain variations and gradations; but, as colour of the flowers is certainly to some extent a useful guide, I think it better to attempt a subdivision on this basis.

* Yellow-flowered species with radiating dark lines on the lower petals, rarely or hardly ever with violet-coloured flowers.

Continental species belonging to this series are *V. alpestris* Jordan, *V. flavescens* Jordan, and *V. Provostii* Boreau. Of these, only the last, as far as I am aware, has hitherto been definitely recorded for any part of Great Britain. A plant bearing marked similarity with *V. alpestris* Jordan in several of its most important characteristics was gathered by Mr. W. A. Shoolbred on Kirkibost Island, N. Uist, in 1898. The stem branches copiously; the leaves are ovate or ovate-oblong, the lamina being longer than the petiole. The stipules on the main stem are pinnatipartite, the median lobe being conspicuously larger than the lateral lobes and subsimilar to the leaves; the stipules on some of the lateral branches are somewhat different. The flowers are showy and yellow, with petals longer than the sepals, and lower and lateral petals with radiating dark violet lines. Spur violet-coloured, longer than the appendages of the sepals. It may be well to leave this plant for further study; meanwhile I append a description of *V. alpestris* Jordan, drawn up from the original description and authentic material.

Plant of from 1–3 dm., covered with a very short pubescence, diffuse from the base, much branched, with ascending flexuous branches. Leaves oval or oval-oblong, crenulated, not cordate, with a short petiole enlarged at the summit. Stipules pinnatifid, with 8–10 lateral straight lobes, terminal lobe subsimilar to the leaves. Peduncles elongated, bracteoles whitish, placed below the curvature. Sepals lanceolate, elliptic, acuminate. Corolla large, petals whitish yellow, oboval, overlapping by their edges—the lateral obliquely oboval, the lower oboval, enlarged and emarginate at the summit and marked with five violet striæ. Spur blue-violet, obtuse, compressed, hardly curved, passing the appendages. Capsule oval, obtuse.

The following description of *V. Provostii* Boreau is drawn up from specimens kindly lent me by the Messrs. Groves:—

V. Provostii Boreau, Fl. Centr. ed. iii. p. 82. *V. confinis* Jordan ex Nyman, Conspectus, p. 80; Billot, Fl. Gall. et Germ. Exsicc. Nos. 1825 bis et ter. Root apparently perennial or subperennial. Lower leaves ovate, crenate. Upper leaves ovate-oblong, crenate-serrate, finely hairy, lamina generally longer than petiole, base cuneate, apex obtuse. Middle lobe of stipules oblanceolate, entire or occasionally a little crenate, much narrower than leaves, lateral lobes 2–3 on each side. Peduncles much longer than leaves—bracts some distance from the curvature. Flowers showy, paler yellow than *lutea*, petals longer than sepals. Spur longer than appendages of calyx. Upper petals ± 1·1 cm. long, ·7 cm. broad, Lamina of upper leaves 1·5 cm. long.

This description is taken from a plant collected by Rev. W. H. Purchas on a steep limestone bank near Ecton, North Staffordshire, June 1885, Herb. Groves, and identified as above by Mr. Lloyd.

Specimens I have seen in Messrs. Groves's herbarium from Mr. Lloyd of *V. confinis* Jordan agree in almost every particular, except that the leaves are slightly narrower.

** Flowers yellow or sometimes more or less violet.

Median lobe of stipules entire, oblanceolate or oblong-lanceolate.

V. monticola Jordan, Obs. 2nd Fragm. p. 36. *V. tricolor* L. *κ*, *bella* Gren. & Godr. Fl. France, i. p. 184. Stems erect or ascending. Leaves oval or ovate, suddenly contracted to petiole, upper oblong-ovate. The terminal lobe of the stipule is much narrower than in *V. alpestris* Jordan, and entire. Flowers yellow, or more or less violet or tricoloured. Peduncles longer than the leaves. Petals always longer than the sepals. Spur considerably longer than the appendages of the calyx. The head-quarters of this Violet are in the South and East of France, and Jordan's specimens of *V. monticola* from Bagnères de Luchon are in the National Herbarium. Mr. G. C. Druce records var. *bella* Gren. & Godron from high ground near Streatley and Tattendon, and at Bradfield and Beenham, Berkshire (Fl. Berks, p. 79).

I have followed MM. Rouy & Foucaud in considering *V. tricolor* L. *κ*. *bella* Gren. & Godr. synonymous with *V. monticola* Jordan, as I have compared specimens and the original description of var. *bella* Gren. & Godr. with Jordanian specimens of *V. monticola*, and they seem to agree in all leading characteristics.

Some British plants which I have had an opportunity of examining from near Stokenchurch, Oxon, referred to var. *bella* Gren. & Godr. by Prof. Freyn, agree well in the flowers with specimens of *monticola*, but the median lobe of the stipule is broader.

The above description is drawn up from authentic continental material.

⁂ Upper petals generally bluish violet; the others pale. Petals more rarely yellow.

In this series occur two plants closely related to each other. The names of both of them have appeared as suggested identifications for plants of this country. The following notes on them are from the original descriptions of M. Jordan:—

V. SAGOTI Jordan, Obs. Fragm. 2, p. 34. Lower leaves with rather long petioles, oval or oval-oblong, base cuneate or subcuneate or lowest subcordate, upper leaves narrower, lanceolate. Stipules pinnatifid. Petals longer than the sepals. Upper petals broad obovate. Differs from *V. carpatica* Borbás by the lamina of the leaves being not so elongated, and broader.

In the *Flora of Oxfordshire* Mr. Druce refers a plant from Stow Wood to *V. Sagoti;* and there are specimens in his herbarium referred here, on the authority of Prof. Freyn, from (*a*) near Forfar; (*b*) Ballater, S. Aberdeen; (*c*) Braemar, S. Aberdeen.

V. PAILLOUXII Jordan, *l. c.* p. 36. Near *V. Sagoti*, from which it differs by its upper leaves being more elongated and more pointed. Stipules pinnatifid, but their lobes are longer and more pointed. The petals are very similar to those of *V. Sagoti*, and are of a bluish violet, sometimes very pale. The sepals are more acuminate.

⁂⁂ Petals generally violet-coloured and yellowish white in the throat, or upper petal violet, and lateral and lower petal paler.

To this series belong *V. lepida* Jordan and *V. carpatica* Borbás, both of which names have been suggested for British plants.

V. LEPIDA Jordan, *Pugillus*, p. 28. Root perennial. Stems ascending, branched from the base. Leaves pale green, puberulous, lower ovate or lanceolate, somewhat obtuse, crenate. Stipules pinnatifid, lateral lobes linear, subpatulous, intermediate oblong, almost spathulate, subentire or slightly dentate. Petals twice as long as the calyx, upper obovate, of a beautiful cærulean violet, lateral pale blue, lowest broadly obovate, whitish or violet. Spur violet-coloured, patent-deflexed, longer than the appendages of the calyx. Capsule subrotund.

A plant gathered in 1860, near the Spital of Glen Shee, in Perthshire, by my father, was referred to this species by Prof. Boreau (Journ. Bot. i. pp. 11, 12). A plant collected by Mr. W. A. Shoolbred near Fort George, E. Inverness, is closely allied; and another allied plant is one collected by Rev. E. S. Marshall near Roy Bridge, Glen Spean, W. Inverness (Herb. Groves), but this latter perhaps would be better placed as a form of *V. amœna* T. F. Forster.

V. CARPATICA Borbás in Koch's Synopsis, ed. iii. p. 222 (1892); Baker fil. Journ. Bot. 1901, p. 10. The British habitat is Cockerham Peat Moss, West Lancashire. I have noted other gatherings from this county which are very closely allied to this species—as, for instance, a plant gathered by the Rev. E. S. Marshall near Sandling Park, East Kent, no. 1345.

V. polychroma Kerner is allied to *V. carpatica* Borbás, but differs in the broader lamina of the leaf.

In the limitation of the group of *V. saxatilis* I have ventured to differ slightly from MM. Rouy & Foucaud in their recent Flora—thus, for instance, *V. contempta* Jordan, which was recorded many years ago on the authority of M. Boreau from cornfields near Thirsk, seems better placed with certain of its allies not in the present group, but in that of which the representative species is *V. tricolor* L. (sensu stricto). There are other continental described species and varieties belonging to this group which it is only necessary to briefly mention. They have never been recorded as growing in this country.

V. polychroma Kerner, already mentioned, and *V. tricolor* L. var. *perrobusta* Borb. Magyar Növ. Lap. 1888, p. 18, is stated by Borbás (in Koch, Synopsis, ed. 3, i. 221) to be "*V. lutea*—> *tricolor*." It has tricoloured flowers, and is allied to *V. tricolor* by its stipules, and is only known from Upper Hungary.

I have to tender my best thanks to Messrs. H. Groves, W. A. Shoolbred, and G. C. Druce for the loan of the pansies from their herbaria.

KENT MOSSES.

By E. M. Holmes, F.L.S.

(Concluded from p. 182.)

The following list includes additional localities for species already recorded for the county of Kent, and also a few species new to the county, the names of which have been received, since the last paper was published, from Mr. L. J. Cocks, of Bromley Hill, to whom the initials L. J. C. in the text refer. The initials E. G. refer to the late Mr. Edward George, of Forest Hill, whose collection is now, I believe, in the possession of the Horniman Museum. A few species new to the county, added since the last list was published, are indicated by an asterisk.

Where the generic name has been altered, since the publication of the list of mosses in the Journal of Botany in 1877, the name then in use follows in parenthesis the name now used. In this list the order given in Dixon's *Handbook of British Mosses* has been followed.

Sphagnum cymbifolium Ehrh. Bedgebury Wood, Goudhurst, *J. S.*—Var. γ *congestum* Schimp. Kildown Wood, Goudhurst, *J.S.*—*S. subsecundum* Nees. Louisa Lake, Bedgebury Wood, *J. S.*—Var. *contortum* Schimp. Bedgebury Wood, *J. S.*—*S. squarrosum*, Pers.

Louisa Lake, Bedgebury Wood, *J. S.*—*S. acutifolium* Ehrh. Goudhurst, *J. S.*—*S. intermedium* Hoffm. Goudhurst, *J. S.*

Tetraphis pellucida Hedw. Goudhurst, frequently in fruit; Cranbrook, *A. W. Hudson*, *J. S.*

Catharinea undulata Heb. S. Mohr. (*Atrichum*). Goudhurst, *J. S.*; Sevenoaks!—Var. *β attenuata* Wils. Sevenoaks!

Polytrichum nanum Brid. (*Pogonatum*). Bedgebury Wood!—*P. aloides* Brid. (*Pogonatum*). Tunbridge Wells! Goudhurst, *J. S.*—*P. urnigerum* Brid. (*Pogonatum*). Goudhurst, *J. S.*—*P. formosum* Hedw. Bedgebury Wood, *J. S.*—*P. commune* L. Goudhurst, *J. S.*; Greenhithe, *E. G.*—*P. juniperinum* Hedw. Goudhurst, *J. S.*; Biddenden! Mereworth Woods, near Malling!—*P. piliferum* Schreb. Bedgebury Wood!

Leucobryum glaucum Hampe. Goudhurst!

Pleuridium axillare Lind. (*P. nitidum* Br. & Sch). Bedgebury Wood! St. Paul's Cray Common, *L. J. C.*—*P. subulatum* Br. & Sch. Goudhurst!

Ditrichum homomallum Hampe. Bedgebury Wood, *J. S.* — *D. flexicaule* Hampe. Between Sibertswold and Waldershare Park abundantly.

Ceratodon purpureus Brid. Goudhurst, *J. S.*

Dicranella rufescens Schimp. Spring Park Wood, W. Wickham, *L. J. C.*—*D. cerviculata* Schimp. Goudhurst, *J. S.*—*D. heteromalla* Schimp. Goudhurst, *J. S.*—*D. varia* Schimp. Goudhurst, *J. S.*

Dicranoweissia cirrhata Lindb. Goudhurst, *J. S.*

Campylopus flexuosus Brid. Goudhurst, *J. S.*—*C. pyriformis* Brid. Goudhurst, *J. S.*

Dicranum scoparium Hedw. Goudhurst, *J. S.*—*D. Bonjeani* De Not. Ginning's Springs, Westenhanger!

Fissidens bryoides Hedw. Forest Hill, *E. G.*; Goudhurst, *J. S.*—*F. exilis* Hedw. Pickhurst Green, near Bromley, *L. J. C.*—*F. adiantoides* Hedw. Folkestone, *Miss K. Appleford.*—*F. taxifolius* Hedw. Forest Hill, *E. G.*; Goudhurst, *J. S.*—*F. viridulus* Wahl. Goudhurst, *J. S.*

Grimmia apocarpa Br. & Sch. Goudhurst, *J. S.*; Sevenoaks; Egerton; Newington, near Sandgate!—*G. pulvinata* Sm. Maidstone! Tenterden, *Dr. E. A. Heath*; Goudhurst, *J. S.*—*G. trichophylla* Grev. Hydropathic grounds and Rusthall Common; Tunbridge Wells, abundantly! Goudhurst!

Rhacomitrium aciculare Brid. Goudhurst, *J. S.*

Acaulon muticum C. M. (*Phascum*). Sevenoaks; Eynsford, abundantly!

Phascum cuspidatum Schreb. Goudhurst, *J. S.*—*P. Flœrkeanum* W. & M. Keston, *L. J. C.*—*P. curvicolle* Hedw. Shoreham!

Pottia recta Lindb. Folkestone Warren!—*P. minutula* Br. & Sch. Goudhurst!—*P. Starkeana* C. Müll. Bedgebury Wood! Dover!—*P. truncatula* L. Goudhurst, *J. S.*—*P. cavifolia* Ehrh. Kemsing! Dover!—*P. lanceolata* Schimp. Seal! Folkestone!—*P. intermedia* Fürnr. (*truncatula* L. *β major*). Goudhurst, *J. S.*; Coney Hill, Hayes, *L. J. C.*

Tortula ambigua Angstr. Goudhurst, *J. S.*—*T. aloides* Br. & Sch.

Goudhurst, *J. S.*—*T. marginata* Br. & Sch. Goudhurst, *J. S.*; Southborough, Tunbridge Wells; Chipstead; and White Rock, near Sevenoaks; Sandling, near Maidstone; on bricks, Bromley, *L. J. C.*—*T. mutica* Lindb. (*latifolia* Br. & Sch.). Goudhurst, *J. S.*—*T. subulata* Brid. Tunbridge Wells; Goudhurst, *J. S.*—*T. muralis* Hedw. and var. *æstiva* Brid. Goudhurst, *J. S.*—*T. ruralis* Hedw. Goudhurst, *J. S.*—*T. intermedia* Berk. Goudhurst, *J. S.*—*T. lævipila* Schwaegr. Goudhurst, *J. S.*; Sevenoaks!—*T. papillosa* Wils. Goudhurst, *J. S.*; Sevenoaks! Hayes Ford, near Bromley, *L. J. C.*

Barbula lurida Lindb. (*Trichostomum*). Tunbridge Wells; Shoreham; Ightham; Greenhithe; Lenham; Sandgate. In fruit, in December, near Godden Green, and near Bessell's Green, on stones, partly immersed in the ground! Goudhurst, *J. S.*; Down, *L. J. C.*—*B. rubella* Mitt. (*Trichostomum*). Goudhurst, *J. S.*; Sevenoaks!—*B. tophacea* Mitt. (*Trichostomum*). Goudhurst, *J. S.*—*B. fallax* Hedw. Goudhurst, *J. S.*—*B. rigidula* Mitt. (*Tortula*). Goudhurst, *J. S.*—*B. cylindrica* Schimp. (*Tortula insulana* De Not.). Seal; Sevenoaks! Goudhurst, *J. S.*—*B. vinealis* Brid. (*Tortula*). Riverhead! fruiting near Sevenoaks and Maidstone! Goudhurst, *J. S.*—*B. sinuosa* Braithw. (*Tortula*). Basted; Lenham!—*B. Hornschuchiana* Schultz. (*Tortula*). Shoreham! Borough Green! Bessell's Green!—*B. revoluta* Brid. (*Tortula*). Riverhead! Tunbridge Wells! Goudhurst, *J. S.*—*B. convoluta* Hedw. (*Tortula*). Keston Common; Folkestone! Sevenoaks! Goudhurst, *J. S.*—*B. unguiculata* Hedw. (*Tortula*). Goudhurst, *J. S.*

Leptodontium flexifolium Hampe. Bedgebury, Goudhurst, *J. S.*

Weissia viridula Hedw. Goudhurst, *J. S.*—*W. tenuis* C. M. On chalk, Leaves Green, *L. J. C.*

Encalypta vulgaris Hedw. Seal!

Zygodon viridissimus Brid. Goudhurst, *J. S.*; Folkestone Warren! —Var. *δ rupestris* Lind. In fruit on a wall near Bessell's Green!

Ulota Bruchii Brid. Goudhurst, *J. S.*; Ightham!—*U. phyllantha* Brid. Sibertswold!

Orthotrichum cupulatum Hoffm. Kemsing.—*O. saxatile* Brid. Sandgate! West Malling!—*O. tenellum* Bruch. Chilstone Park, near Charing!—*O. affine* Schrad. Wrotham! West Malling! Sibertswold!—*O. Sprucei* Mont. Goudhurst, *J. S.*

Ephemerum serratum C. M. Kevington and Farningham Woods, *L. J. C.*; Goudhurst, *J. S.*

Physcomitrium pyriforme Br. & Sch. Goudhurst, *J. S.*; Ightham! Seal!

Funaria fascicularis Schimp. Grove Park, *L. J. C.*—*L. hygrometrica* Hedw. Chevening! Borough Green! Stone Street! Swanscombe Wood! West Malling! Goudhurst, *J. S.*

Aulacomnion palustre Schwaegr. (*Gymnocybe*). Goudhurst, *J. S.*; the fructification rare.—*A. androgynum* Schwaegr. Goudhurst, *J. S.*; Stone Street! Southborough, *W. Fawcett.*

Bartramia pomiformis Hedw. Goudhurst, rather rare, *J. S.*

Philonotis fontana Brid. Keston Common! Westenhanger! Goudhurst, *J. S.*

Leptobryum pyriforme Wils. Goudhurst, *J. S.*

Webera nutans Hedw. (*Lamprophyllum*). Rusthall Common! Keston Common! Goudhurst, *J. S.*—*W. annotina* Schwaegr. (*Lamprophyllum*). Goudhurst, *J. S.*—*W. carnea* Schimp. (*Lamprophyllum*). Beechborough! Folkestone! Goudhurst, *J. S.*—*W. annotina* Schwaegr. (*Lamprophyllum*). Goudhurst, *J. S.*—*W. albicans* Schimp. (*Lamprophyllum*). Goudhurst, *J. S.*—*W. Tozeri* Schimp. (*Epipterygium*). Goudhurst, *J. S.*

Bryum pendulum Schimp. Catford Bridge, *E. George*.—*B. torquescens* Br. & Sch. Folkestone Warren, abundantly!—*B. cæspiticium* L. Maidstone! Kemsing!—*B. capillare* L. Goudhurst, *J. S.*; Basted!—*B. Donianum* Grev. Godden Green; fruiting in Seal Hollow Road, Sevenoaks! Goudhurst, *J. S.* — *B. atropurpureum* Web. & Mohr. Folkestone Warren! Goudhurst, *J. S.*—Var. *gracilentum* Tayl. Kevington, *L. J. C.*—*B. erythrocarpum* Schwaegr. Pole Hill! Seal Park! Goudhurst, *J. S.*; Ashover Wood, Penshurst! *B. murale* Wils. Sevenoaks! Basted! Boxley, near Maidstone! Tunbridge Wells! Greenhithe! Newington, near Sandgate! Goudhurst, *J. S.*—*B. alpinum* Huds. Spring Park Wood, *L. J. C.* (The locality is a somewhat unusual one, from its low elevation.) — *B. argenteum* Linn. Catford Bridge, *E. George*; Goudhurst, *W. E. N.* —*B. roseum* Schreb. Holwood, *L. J. C.*: Godden Green and Bessell's Green, near Sevenoaks!

Mnium affine Bland. Ightham! — *M. undulatum* L. Hungershall Rocks! fruiting abundantly on a large detached rock, April, 1878, since destroyed; Chevening Park! Goudhurst, *J. S.* — *M. cuspidatum* Hedw. Knowle Park, Sevenoaks, fruiting occasionally. — *M. rostratum* Schrad. Tunbridge Wells, *T. Walker*; Seal! Goudhurst, *J. S.*—*M. hornum* L. Sevenoaks, abundantly! Goudhurst, *J. S.* — *M. undulatum* Hedw. Cranbrook, *A. W. Hudson*.—*M. punctatum* L. Goudhurst, *J. S.*

Fontinalis antipyretica L. Seal! Mereworth Woods! Lullingstone Park! Goudhurst, *J. S.*

Cryphæa heteromalla Mohr. Sevenoaks! Chevening! Goudhurst, *J. S.*

Neckera complanata Huebn. Dunton Green! Goudhurst, *J. S.*; Bredhurst!—*N. pumila* Hedw. Tunbridge Wells! Goudhurst, *J. S.*

Homalia trichomanoides Brid. Sevenoaks! Bredhurst! Goudhurst, *J. S.*

Pterygophyllum lucens Brid. Goudhurst, in fruit!

Leucodon sciuroides Schwaegr. Goudhurst, *J. S.*

Leskea polycarpa Ehrh. Goudhurst, *J. S.*

Anomodon viticulosus Hook. & Tayl. Goudhurst, *J. S.*; Greenhithe, *E. George*; fruiting near Ightham Moat, White Rock, and Godden Green, near Sevenoaks!

Heterocladium heteropterum B. & S. Hungershall Rocks!

Thuidium abietinum B. & S. (*T. histricosum* Mitt.). Cudham! Shoreham!—*T. tamariscinum* B. & S. Goudhurst, *J. S.*—*T. recognitum* Hedw. Near "The Fox," Keston, *L. J. C.*

Isothecium myurum Brid. Goudhurst, *J. S.*

Cylindrothecium concinnum Schimp. Brastead and Down, *L. J. C.*; Kemsing!

Pleuropus sericeus Dixon (*Homalothecium*). Dunton Green, *E. G.*; West Malling, in fruit; Goudhurst, *J. S.*

Camptothecium lutescens B. & S. Greenhithe, *E. George*; Dover!

Brachythecium glareosum B. & S. Ightham!—*B. albicans* B. & S. Bedgebury Wood, *J. S.* — **B. salebrosum* B. & S. Bredhurst, *J. Marten.* — Var. γ *palustre* Schimp. Syn. Biddenden! — *B. rutabulum* B. & S. Forest Hill, *E. George*; Goudhurst, *J. S.*— *B. rivulare* B. & S. Goudhurst, *J. S.*— *B. velutinum* B. & S. St. Paul's Cray, *E. George*; Goudhurst, *J. S.* — *B. populeum* B. & S. Bredhurst!—*B. plumosum* B. & S. Hungershall Rocks! Bedgebury Wood, *J. S.* — *B. cæspitosum* Dixon. Knowle Park, Sevenoaks! Goudhurst, *J. S.* — *B. purum* Dixon. Goudhurst, *J. S.*; Greenhithe, *E. George.*

Eurhynchium crassinervium B. & S. Beechborough! Godden Green! — *E. piliferum* B. & S. Goudhurst, *J. S.* — *E. prælongum* B. & S. Chevening! Goudhurst, *J. S.* — *E. Swartzii* Hobkirk, Goudhurst, *J. S.*; Ightham and near Otford, in fruit! — *E. curvisetum* Husn. Goudhurst, *J. S.* — *E. pumilum* Schimp. Pole Hill, Dunton Green! Goudhurst, *J. S.*—*E. myosuroides* Schimp. Goudhurst, *J. S.* — *E. tenellum* Milde. Greenhithe, *E. George*—*Var. *scabrellum* Dixon. Farningham, *L. J. C.*; Sevenoaks, Shoreham! — *E. striatum* B. & S. Greenhithe, *E. George*; Goudhurst, *J. S.* — *E. abbreviatum* Schimp. Goudhurst, *J. S.* — *E. murale* Milde. Basted. — *E. confertum* Milde. Greenhithe. *E. George.*— *E. megapolitanum* Milde. Sevenoaks!

Plagiothecium depressum Dixon. Stone Street! Maidstone! Bredhurst! — *P. latebricola* B. & S. Chipstead! Goudhurst, with gemmæ, *J. S.*! woods between Bromley and Beckenham, *L. J. C.* —*P. denticulatum* B. & S. Chevening Park, *E. G.*; West Malling! — *P. sylvaticum* B. & S. Bredhurst! — *P. undulatum* B. & S. Greenhithe, *E. G.* — *P. silesiacum* B. & S. On stumps of *Castanea vesca*, Kippington, Sevenoaks!

Amblystegium serpens B. & S. Greenhithe, *E. G.* — **A. varium* Lindb. Kemsing, *L. J. C.*—**A. Juratzkæ* Braithw. Wood between Bromley and Beckenham, *L. J. C.* — *A. irriguum* Schimp. Near Ightham Moat, in fruit!—*A. filicinum* De Not. Dunn's Green!

Hypnum riparium B. & S. (*Amblystegium*). New Cross, *E. G.*; Weald, Sevenoaks. — *H. polygamum* Schimp. Ginning's Springs, near Westenhanger!—*H. chrysophyllum* Brid. Woods near Cudham, abundant; Shoreham; Bredhurst! Cranbrook, *A. W. Hudson.*— *H. aduncum* Hedw. var. β *Kneiffii*. Goudhurst, *J. S.*; Folkestone Warren, plentifully; New Cross, *E. G.* — *H. exannulatum* Gümb. Greenhithe! — *H. cupressiforme* L. Greenhithe, *E. G.* — *H. molluscum* Hedw. Dover! — *H. stramineum* Dicks. Goudhurst, *J. S.* —*H. cordifolium* Hedw. Ginning's Springs, near Westenhanger, very rare; Frizley Bog, Cranbrook, *A. W. Hudson.*—*H. cuspidatum* L. Bredhurst! — *H. Schreberi* Lindb. Greenhithe, *E. G.*; Tunbridge Wells!

Hylocomium splendens B. & S. Tunbridge Wells! — *H. loreum* B. & S. Tunbridge Wells!

ALOPECURUS HYBRIDUS IN BRITAIN.

By A. Bruce Jackson.

In the autumn of 1899 my friend Mr. Henry Bromwich showed me an *Alopecurus* which he gathered in wet spots on the banks of the Avon at Kenilworth, and which exhibited several marked features of interest. While partaking of the characters of *A. geniculatus* and *A. pratensis*, it could not be satisfactorily referred to either species, and indeed seemed to be exactly intermediate between them. In this Journal for 1899. p. 358, Mr. Arthur Bennett, in a note on Mr. Mitten's *Alopecurus pronus* (now expunged from our list as a monstrosity), mentioned another plant, the *A. hybridus* Wimmer (*A. pratensi-geniculatus* Wichura), described in Garcke's *Flora von Nord- und Mittel Deutschland* (ed. vi. p. 438), and alluded to by Syme in *English Botany*, vol. xi. p. 26, who possessed specimens from Bremen collected by Dr. Focke. The publication of this note led me to devote special attention to the Warwickshire novelty, specimens of which had been furnished me by the discoverer. Suspecting that it might be Wimmer's plant, I subsequently forwarded an example to Prof. Hackel, who wrote: "Your grass is certainly the *Alopecurus hybridus* Wimmer (*A. pratensis* × *geniculatus* Wichura). Whether it is a hybrid or not I am unable to decide, but there is reason to suppose that it is of hybrid origin."

On July 15th last, accompanied by Mr. Bromwich, I visited the Warwickshire locality, a low-lying meadow bordering the River Avon at Chesford Bridge, Kenilworth. The meadow had been mown prior to our visit, but we were fortunate enough to find the *Alopecurus* in considerable abundance on the moist margin of the field, where it was associated with coarse herbage which had escaped the scythe. The plant soon attracts attention by reason of its straggling growth and general luxuriance. The upper leaf-sheaths are remarkably glaucous, and in this respect the plant recalls *A. fulvus*, but in structure it differs entirely from that species. It resembles *A. geniculatus* in habit, but the flowering spikes are usually much longer and stouter than in that plant.

The following is a translation of Wimmer's original description of *A. hybridus* in his *Flora von Schlesien*, ed. 3, p. 31 (1857):—

"Alopecurus hybridus, n. sp. *A. nigricans* Wichura im Jahresber. d. Schles. Gesellsch. 1846, p. 61. Culm ascending, geniculate, glabrous; ligule lengthened; glumes hairy on the back, almost shaggy, ciliated, rather blunt, obliquely truncate; awns oblique or slightly geniculate. Found only once, in 1845, by Wichura, at the edge of a pool near Reichenbach, in company with *A. pratensis* and *A. geniculatus*. Habit and size similar to the preceding [*A. pratensis*], but in the construction of the flowers nearer to *A. geniculatus*. The glumes of a dull purple at the point, almost one-third larger than *A. geniculatus;* awn about the same length. Wichura considered this a hybrid of *A. geniculatus* and

A. pratensis, but the characters of our plant do not favour this supposition, the soft ciliated glumes being against the hybrid theory. I am more inclined to consider it a form of *A. nigricans* Hornem., but neither the description in Fries nor the original specimens—in which the glumes are shaggy and have no awns, and the culms are upright—agree with *A. nigricans*. I have in the meantime therefore placed this form under a new name.''

Dr. Heidenreich, in Oesterr. Bot. Zeitschr. xvi. 277 (1866), discusses Wichura's *A. pratensis* × *geniculatus* at considerable length. He gives comparative descriptions of the plant and its assumed parents, and contrasts them as follows:—

A. pratensis.	*A. pratensis* × *geniculatus.*	*A. geniculatus.*
Culmi validi, erecti, 2–3 pedales et ultra.	Culmi subgraciles, basi procumbentes, geniculato-adscendentes; elatiores quam in *A. geniculato;* 1⅔–2 pedales.	Culmi graciles, basi procumbentes geniculato-adscendentes; 1–2 pedales.
Folia 6–9 unciales longa, summum 2–6 unc. longum.	Folia 4–6 uncias longa, summum 1 rarissimo 3 uncias longum.	Folia 2–4 uncias longa, summum ½–1 unc. longum.
Ligula brevis, lineam longa, truncata.	Ligula oblonga, 2 lineas longa, obtusiuscula.	Ligula elongata, 2–3 lineas longa.
Panicula crassa, 2–4 uncias longa, 3–4 lineas lata, ramis 1–7 spiculas gerentibus.	Panicula subgracilis, 1¾–2¼ unc. longa, 2¾ rarissimo 4 lineas lata; ramis 1–4 spiculas gerentibus.	Panicula gracilis, 1½–2 uncias longa, 2–3 lineas lata; ramis 1–2 spiculas gerentibus.
Spiculæ 2 lineas longæ, ovato-lanceolatæ.	Spiculæ 1¾ lin. longæ, oblongo-lanceolatæ, subovatæ.	Spiculæ lineam longæ, ovato-oblongæ.
Glumæ acutæ, tertia ima parte connatæ, carina villoso-ciliata.	Glumæ obtusiusculæ, quinta v. quarta ima parte connatæ; carina piloso-ciliata.	Glumæ apice subtruncato-obtusæ, basi ima connatæ; carina ciliata.
Palea acutiuscula.	Palea obtusiuscula.	Palea obtusissima.

On examination I find that the Warwickshire plant exhibits all the characters ascribed to *A. hybridus* by the above authors. As will be seen from the accompanying descriptions, the flowering glumes and pale afford an important distinguishing character. They differ markedly from *A. pratensis* in being considerably smaller and blunter, but not so obtuse as in *A. geniculatus*. The ciliation of the glumes is also very conspicuous, the hairs being apparently stiffer and coarser than in the allied plants. I am inclined to think that this Foxtail is a cross resulting from the association of the above mentioned species. In support of the hybrid theory I must point out that we found both the alleged parents occurring almost within a stone's-throw of the meadow which yields *A. hybridus*. Mr. Bromwich suggests that both *A. geniculatus* and *A. pratensis* may have originally occurred in the field, and that the resulting hybrid may have survived its parents there. In no description of this plant can I find any mention of the glaucous sheaths. This character may not, however, be a permanent one, although it is very marked in Warwickshire examples.

Last autumn the Rev. H. P. Reader sent me a curious *Alopecurus* collected by him in very wet spots by the Trent near Armitage, Staffordshire. This plant has not the glaucous tint of the Warwickshire *A. hybridus*, and the hairs fringing the glumes are finer and less shaggy; but in all other respects it resembles Wimmer's plant, and must, I think, be left under it. It is difficult to understand why Wimmer named the Silesian novelty *A. hybridus*, while doubting its hybrid origin.

I have not had an opportunity of consulting the specimens named *A. pronus* in Mr. Borrer's herbarium at Kew, but Newbould, who, according to Syme, made a casual examination of them, expressed the opinion that there was a mixture of specimens, or that they were hybrids. If the latter be the case, it is possible, as Mr. Bennett suggests, that they are the same as *A. hybridus*.

I hope that British botanists will keep a look-out for this interesting grass during the present summer. It may possibly prove to be not uncommon in moist meadows.

P.S.—Since writing this paper, Prof. Hackel has supplied me with further information regarding *A. hybridus*, and has also furnished me with its distribution on the Continent. The following is an extract from his letter:—

"*Alopecurus hybridus* Wimm. Fl. v. Schles. 3 ed. 31 (1857) is certainly a hybrid of *pratensis* × *geniculatus;* Wimmer himself gave this name (*prat.* × *genic.*) for it in Denkschr. Schles. Gesellsch. 149 (1853); at a later period (1857) he doubted the hybrid nature of the plant, but he was wrong in doing so. The identification with *A. nigricans* Horn. (*A. ventricosus* Pers., *A. arundinaceus* Poir.) was made by Wichura in Act. u. Veränd. Schles. Ges. 1845, 59; 1846, p. 63, not by Wimmer, and was erroneous.

"The synonymy of the plant is:—

ALOPECURUS PRATENSIS × GENICULATUS Wimmer, Denkschr. Schles. Ges. 1853, p. 149.
A. nigricans Wichura, *l. c.* 1846, p. 63, *non* Hornem.
A. hybridus Wimm. Fl. v. Schles. ed. 3, p. 31 (1857).
A. intermedius Hallier, Fl. v. Helgol. Bot. Zeit. xxi. (1863).

"*Distribution.* Germany: Bremen, Helgoland, Tilsit, Jena, Saalfeld, Leipzig, Schlesien (Liegnitz). Bohemia: Prepechy. Galizia: Lemberg. Russia: Fernia, St. Petersburg."

[The plant is also described in Ascherson and Graebner's *Synopsis Mitteleuropäischen Flora*, liefer. vii, part 2, pp. 138, 139 (1899), to which reference may be made.—ED. JOURN. BOT.]

TRIFOLIUM PRATENSE VAR. PARVIFLORUM.

By I. H. Burkill, M.A., F.L.S.*

There are three abnormal states of the common red clover in which the corolla is found unduly shortened. One of these is due to an insect larva which feeds within the bud, stunts its growth, causes it to remain closed and the basal parts to be fleshy; the second occurs when the petals are in part sepaloid; the third is a condition in which the corolla-tube is crumpled and the ovary slightly foliaceous; moreover it generally has peduncles to the heads and short pedicels to the flowers. This last is *Trifolium pratense* var. *parviflorum*, and has the following synonymy:—

T. pratense var. *parviflorum* Babingt. Manual Brit. Bot. ed. 1 (1843), p. 72; Lange in Oeder's Flora Danica, t. 2782.

T. brachystylos Knaf in Lotos, 1854, p. 237.

T. pratense var. *pedicellatum* Knaf ex Celakovsky, Prod. d. Flora von Boehmen, iii. (1875) p. 669.

T. pratense forma *T. brachyanthemum* β *heterophyllum* Rouy in Rouy et Foucaud, Flore de France, v. (1899) p. 120 (published as Ann. Soc. Sc. Nat. Charente-infér.).

Babington's type-specimens from Elgin, as well as others from Plymouth and Walton-on-Naze, and a type of Lange's figure have been accessible to me in the Herbarium at Cambridge; a type of Knaf's name, collected by Auerswald in Bohemia,† has been seen in the Botanical Department of the British Museum of Natural History, South Kensington; at the Royal Gardens, Kew, are specimens collected at Fairmile in Surrey, at St. Leonards, at Tonbridge Wells, and at Elgin, from the herbaria of Borrer and H. C. Watson, and from near Bordeaux, collected by C. des Moulins; and I have myself collected it at Hunstanton in Norfolk, Gatton Park in Surrey, Waltham St. Lawrence in Berkshire, and (in company with Mr. G. Nicholson) near Heiligenblut in Carinthia—on each occasion a single root. All these specimens agree very closely.

The first definition of the variety *parviflorum* runs: "heads more or less stalked: calyx-teeth as long as, or longer than, the corolla," and is correct as far as it goes. Celakovsky's description is "Ähren grösstentheils gestielt; Blüthen länger oder kürzer gestielt; Deckblätter theilweise ausgebildet; Griffel kürzer als die

---

* [Reprinted from the *Proceedings of the Cambridge Philosophical Society*, vol. xi. part I. pp. 29–31. Read 26 November, 1900.]

† [Mr. Burkill has omitted to notice that the type was collected, not by Auerswald (from whose herbarium it came) but by Knaf himself, at Tomatan, in June, 1856. The attached label is signed by Knaf, who had named the plant *T. brachystylos*, and then added the following note: "Differt a *T. pratensi* floribus plus minus longi pedicellatis, pedicellis interdum ramosis, stylis brevioribus, tubum corollæ non æquantibus, capitulis aliis bractea suffultis, aliis sæpe destitutis; foliolis fol. rad. apice emarginatis, etc. '*Lotos*' etc. Nihilominus tamen *varietatem* memorabilem *T. pratensis* esse puto, cui nomen propono: *var. pedicellatum.*" We gathered the plant many years ago at the Balham end of Wandsworth Common, where it occurred in some quantity.—Ed. Journ. Bot.]

Staubgefässe." But the following is fuller and more in accord with the specimens:—Plant not robust; heads more or less stalked; bracts sometimes developed; corolla in the mature flower crumpled at the base within the calyx and not exceeding the longest of the calyx-teeth; pistil becoming foliaceous, the ovarial part linear-lanceolate, and often open above; ovules more or less aborted.

Examination of buds not ready to expand reveals no crumpling of the corolla; so that this evidently takes place in the rapid growth of the tube which precedes the expansion of the flower; and it is impossible to resist the assumption that the unusual size of the ovary and the narrowness of the mouth of the calyx are the causes of it.

Phyllody of the ovary to a greater degree than in typical *parviflorum* is not uncommon in *Trifolium pratense*; less modification in this direction I have found in a plant from Glen Clova, Forfarshire, where the peduncle and pedicels were undeveloped, but the corolla crumpled and the ovary elongated, though seen on microscopic examination to contain two normal seeds.

Nyman* correctly called *T. pratense* var. *parviflorum* an abnormal condition; Penzig has given it a place in his *Pflanzen-teratologie* †; and Babington,‡ until the publication of Lange's incorrect figures of the petals and ovary, doubted if it were more than an accidental state. I have wished here to show how it is abnormal.

Lange found his specimens at two localities in Denmark; Ascherson § records it as occurring near Karlsruhe; and Magnus, who mentions the foliaceous carpels,|| had it from Memel in East Prussia. Others have named additional localities.

Less robust than the common form of *Trifolium pratense*, it resembles superficially the variety of this species called *T. microphyllum* by Lejeune in his *Flore des environs de Spa*,¶ a type of which may be seen at Kew. As Lange wrote "*T. pratense* var. *microphyllum*" on the label of his specimen, I believe that he recognized this; but *T. microphyllum* (*T. pratense* var. *microphyllum* Lejeune & Courtois) is not an abnormality.

Similar also in habit are plants with prolification of the flower, which I have seen from various places in Britain and have collected near Bagnères-de-Bigorre in the Pyrenees; and superficially similar in the flower-head is *T. pratense* var. *multifidum* Seringe**—another abnormality, of which a type may be seen at Kew. It is abnormal from sepalody of the petals.

---

* *Conspectus Floræ Europeæ*, Oerebro, 1878, p. 173.

† Genoa, 1890, i. p. 386.

‡ *Memorials, Journal and Botanical Correspondence of C. C. Babington*, Cambridge, 1897, p. 421.

§ *Verhandl. bot. Vereins Brandenburg*, xx. 1878, p. 110.

|| *Ibid.* xxi. 1879, p. 80.

¶ Liège, 1811, ii. p. 115. *T. microphyllum* Desv. is *T. pratense*, but I do not know for certain in what form or variety.

** In *DC. Prod.* ii. (Paris, 1825), p. 195.

BIBLIOGRAPHICAL NOTES.

XXVIII.—PERIODICAL PUBLICATIONS.

THE notes on the dating and indexing of botanical periodicals which appeared in this Journal for 1894 (pp. 180, 271) and 1896 (p. 168) have justified their publication, in that certain journals have adopted the suggestions made. The matter, however, is of so much importance, as everyone engaged in bibliographical investigation knows, that I may be excused for recurring to it. It would certainly be a great gain to posterity if some general plan of dating and indexing could be agreed upon, and this should not be difficult, at any rate so far as dating is concerned.

The following remarks are not intended to be exhaustive. They are based upon periodicals which happen to be readily accessible at the time of writing, and which must be constantly referred to by workers at systematic botany. Certain repetitions will be found of points indicated in the former articles; such repetitions may perhaps be excused on account of the practical importance of the subject.

DATING.

Since attention was called to the matter, the *Botanische Jahrbücher* has borne on the back of the title-page the date of each of the parts composing the volume, and in a supplement to vol. xxvi. is given a list of the dates of each part of the preceding twenty-five volumes. There is thus no difficulty in ascertaining the date of publication of any species included in the work. A similar reform has been introduced in the *Boletim da Sociedade Broteriana*, although here the dates are placed on the back of the last page of the index, where they are likely to be overlooked, and the month only, not the day of the month, is given.

The Italian periodicals are singularly unsatisfactory, not only in dating but in other particulars. The *Nuovo Giornale Botanico Italiano* appears quarterly, and bears on its wrapper and at the head of each number the month in which it nominally appears, but there is reason to doubt whether this information is altogether trustworthy; the number dated January of this year, for example, did not arrive until the beginning of March, and the number of the *Bullettino della Società Botanica Italiana*, dated "Ottobre-Novembre 1900," came to hand on Feb. 5th, 1901; this, by the way, is dated only on the cover. *Malpighia* is in even worse case, for the only date on the wrapper is that of the year of issue. It is styled "rassegna mensuale," but never even approximates to a monthly issue; during 1899, for example, it was published in six parts, containing respectively fascicles 1, 2; fascicle 3; fascicle 4; fascicles 5, 6, 7; fascicles 7–10; fascicles 11, 12. The curious Italian custom by which the title-page of a volume is issued with its first number instead of with its last prevents the insertion of the actual dates of publication on the back of the title, and in the case of *Malpighia* further conflicts with accuracy. Of the volume for 1900, the part containing fascicles 1–4 was received at the beginning of November of that year; the second part (fasc. 5–8) arrived towards the end of February last; the third part (fascicles 9–12), completing the volume, comes at the beginning of June, but the title-page of the volume appeared in the first part, and, like the wrappers of each part, is dated 1900!

The dating of the *Bulletin of Miscellaneous Information* has so often formed the subject of comment in these pages that there is no need to refer to it further than to say that the volume for 1899 is still incomplete, the last number issued being that for "September and October" (published in October) of that year. The reference to "Kew Bulletin, 1900, ined." in the *Botanical Magazine* for November last is thus likely to mislead, as no issue of the *Bulletin* (save certain appendixes) appeared during 1900. A difficulty may therefore arise as to the authority for the species to which this reference is appended; it is described (*l. c.*) by Sir Joseph Hooker, and must, we think, be accredited to him, his citation of "Rolfe in Kew Bulletin, 1900, ined.," being that of an unpublished name. The actual dates of the issues of the *Bulletin* during 1895–98 will be found in this Journal for 1896, 169; 1897, 451; 1898, 239; 1899, 399.

The *Journal de Botanique* is another periodical in which the convenience of posterity is persistently ignored. The numbers since April, 1899, have been systematically misdated, several bearing the date 1900 not having been issued until the present year; and as the title-page to the volume bears the date of the nominal year of issue, it will be extremely difficult in the future to ascertain the exact or even nearly approximate period of publication.

In American periodicals the danger seems to lie in another direction. The dates of publication are given with such absolute exactitude as sometimes to arouse suspicion. For example, the January number of the *Bulletin of the Torrey Botanical Club* bears at the foot of its first page "issued 31 January." The number contains sixty pages and six plates; can we certainly conclude that the arrangements of the *Bulletin* are so perfect that no hindrance can possibly arise which may invalidate the entry on p. 1? The date on the last number for 1900 is Dec. 29th, in another year it was Dec. 30; here it is evident that a very slight delay would cause the new species appearing in the number to date from the following century. The *Botanical Gazette* is dated on the first page of the advertisements which precede the contents; the drawback to this plan is that it disappears in the bound volume. I am inclined to think that the best plan yet suggested is that in the first number of *Torreya*, which states that "the exact date of publication of each issue is given in the succeeding number": certainly by this method accuracy should not be difficult.

The matter would, however, be most satisfactorily settled if editors would make it a rule, in cases where there is any doubt as to numbers being issued punctually on the first of the month, of placing on the back of the title-page of the volume the exact date of each. If this were always done, folk would know where to look for the intimation, which at present, even when supplied, appears in very different situations; and would thus be saved much of the unnecessary trouble which every systematic worker has experienced.

I am curious to know what value is to be attached to the dates printed at the foot of each sheet or part of a sheet in Prof. E. L. Greene's *Pittonia*. This magazine is issued in parts in the ordinary way, but the dating is remarkable. For example, vol. iv. part 20, "January–April, 1899," is thus allocated at the foot of the pages:

Pages 1–8, 5 Jan. 1899. Pages 25–40, 17 March, 1899.
,, 9–16, 31 Jan. ,, ,, 41–52, 11 April, ,,
,, 17–24, 7 Feb. ,,

The breaks mostly occur in the middle of a genus—"A fascicle of New Violets," for example, is thus divided, and so is *Antennaria*. Are these dates to be accepted as valid for citation? They are recognized as such by American botanists, and what is known as the "Check-list" was issued in sheets, each bearing a date. It would seem to me that the distribution of such fragments ranks with the sending out of "advance copies" of a paper or monograph, and that the true date of publication is that at which the work is obtainable by the public.

It would, I think, tend to convenience if every plate published in a periodical bore the name of the periodical, as well as the volume and date: only in this way can plates be traced which have become separated from the accompanying text. The name of the *Botanical Magazine* appears neither on plate nor letterpress; nor does the name of the plant figured appear on the plate. Each folio of the text is, however, dated; but *Hooker's Icones Plantarum* has not even this aid to identification, and neither text nor plates bear the faintest indication of the method of their publication. The date of the issue of each part is given on the title-page of the volumes.

Indexing.

The *Bulletin of Miscellaneous Information* is now adequately, almost lavishly, indexed. For example, in 1891—the period at which "it was found necessary to publish it monthly"—an index to the first five volumes was issued, followed five years later by another general index, which included the preceding and the subsequent five volumes. It may be well to note that these two indexes are made on different principles, so that the entries in the 1891 index do not necessarily appear in the one issued in 1896. Should a third be issued later, embracing the two former, the compiler would do well to rearrange the material; the entries under "Africa," for example, seem to be in three alphabets, besides a fourth under "African"; the whole, indeed, needs the revision which it will doubtless receive. Meanwhile each volume is fully indexed, not without the kind of cross-reference dear to cataloguers, *e.g.*:—

"Library Association, visit to Kew, 200
——— (*see* Kew)":

when we follow the latter instruction, all that rewards us is

"Kew, visit of Library Association, 200."

It would, however, tend to convenience if the index were always similarly placed; in 1892 it occupies the last pages of the volume; in 1893 it follows the "contents" in the front of volume, and is independently paged; in 1894 the earlier and better position is resumed.

The *Annals of Botany* remains what it has ever been—an astounding example of a high-class journal, edited by men of undoubted position, which is devoid of the faintest pretence to anything in the shape of an adequate index. Under "Contents" we have a list of the papers in each part, exactly as they appear on the covers of each as issued; then comes what is styled an "index." This is in two parts:—"A. Original papers and notes"; "B. List of Illustrations," the latter further divided into "*a*. Plates," and "*b*. Woodcuts." "A" is merely a list, under authors' names, of the headings of the papers, once more taken from the covers of each part. Probably no index ever cost less trouble to make and more to those who want to find out what the volume contains. One wonders that the Clarendon Press, which publishes the *Annals* and deservedly holds a high place in matters bibliographical, can be content to issue a publication so inadequately indexed.*

The index of the *Journal of the Linnean Society* (vol. xxxiii.) shows a tendency to over-elaboration. The introduction of the word "mentioned" when a plant is only incidentally referred to has something to recommend it, for it enables workers to avoid the annoyance of looking up any number of references before arriving at the place where the species is fully discussed; but this result might be attained by a difference of type. We cannot think it necessary to index every variety and even form mentioned in a monograph; for example, the fact that *Arenaria grandiflora* is monographically treated on a given page seems to preclude the necessity of devoting fifteen lines in the index to its varieties and forms. Some of the entries are unnecessarily long; *e. g.* "Horse-Chestnut Tree, Preliminary Observations on the Seasonal Variations of Elevation in a Branch of, by Miller Christy, 501–506," might assuredly be abbreviated for index purposes, and we think the page on which a paper begins is usually considered a sufficient reference. But the fault, if fault it be, is on the right side.

The *Botanical Gazette* has a very full index of subjects, in which new names are printed in black type, and synonyms in italics;

---

* It is not only in its indexes that the *Annals* shows a lamentable want of bibliographical method. In the bibliography appended by Mr. F. F. Blackman to his article on "The Primitive Algæ" in the issue for December last, the date of each paper is given after the author's name in an abbreviated form—thus, "Blochmann, F., '85"; the title of the paper, which follows, has a reference to the volume of the periodical in which the article appeared, but in no case to the page! Occasionally we have such citations as "'97 a," "'97 b," which appear to indicate separate papers published by the author cited during the same year. Mr. G. S. West's contribution on "The Alga-flora of Cambridgeshire," published in this Journal for 1899, is not included in the bibliography, but is mentioned by Mr. Blackman in a supplementary note in the March number of the *Annals*, where the date is inaccurately indicated as "'98."

the names of contributors are indexed, but no indication of their contributions is given. There are some classified entries, but these rightly stand in their places in the alphabetical order. The *Bulletin of the Torrey Club* follows the far less convenient plan of having three indexes—one, styled "contents" is a list of papers under the names of their authors, and follows the title-page; the others—"subject index" and "generic index"—come at the end of the volume. For general inconvenience this is a good second to the *Annals of Botany*, especially with regard to genera. Every reference to a genus, however incidental, is indexed, but no species, not even new ones, are entered; so that, for example, in order to find what new Alliums have been described in the volume, twelve references have to be made, where one would be sufficient if the sensible plan of the *Botanical Gazette* were adopted. *Pittonia* has an excellent index of the plants described in its volumes, but the "contents" are arranged on no plan (or on several plans?), such words as "On," "The," "A," and "Some" standing first in the entries, which are not alphabetical.

The index to the *Bulletin de la Société Botanique de France* is apt to be long delayed, and errs by division; thus in vol. xliii. we have "Comptes rendus des Séances," arranged by dates; then an alphabetical list of the names of authors, with no indication of their work; then a list of books noticed, arranged under authors' names; and finally a list of names of plants. In spite of this elaboration, it is practically impossible to find certain papers in the index without wading through the six pages of "Comptes rendus": even headings which one would expect to see under names of plants—*e. g.* Prof. Van Tieghem's "Classification des Loranthées"—are not to be found there, and of course a paper "sur la division du noyau cellulaire" can only be traced in the "comptes rendus," unless one knows the name of the author. The *Bulletin de l'Herbier Boissier* (vol. vii.) has an index of authors and one of the names of plants, but none of subjects; so that, unless one knew the name of the author, it would be difficult to find that anything had been published on the "dissémination des graines par les poissons." This *Bulletin* publishes certain appendixes, the plants of which are included in the index; but, as the former are paged separately and bound after the index, reference to them is not easy. The *Journal de Botanique* has (1) a list of articles arranged by the names of authors; (2) a list of plates; (3) a "table alphabétique générale des matières,"—no fewer than seven papers stand under "sur," and others under "le," "la," and "les"; (4) an index of the names of plants—four lists where one would serve.

Prof. Engler's *Botanische Jahrbücher* holds among foreign periodicals the pre-eminence for a useless index which is attained by the *Annals of Botany* among periodicals written in English. A list of the papers arranged under authors' names in order of publication, filling barely a page, is considered an adequate guide to the contents of a volume of more than 700 pages! In this case the inconvenience is accentuated by the fact that the volume before us—vol. xxviii.—is almost entirely occupied by systematic papers, including the descriptions of hundreds of new species, not one of which can be found save by the tedious process of searching through many pages of print. With the volume is issued an excellent "Register" of the novelties described in the first twenty-five volumes of the *Jahrbücher*, which, although by no means adequate as an index, is some help towards ascertaining the systematic contents of the series; it would appear therefore as if botanists must wait twenty-five years for a list of species described, or index each volume for themselves. The contrast between *Rhodora*, whose 246 pages occupy 28 columns of index, and the *Jahrbücher*, which considers about a page sufficient for the 705 which follow it, would be ludicrous if the inconvenience to workers could be left out of the question. It is to be hoped that Prof. Engler will take steps to justify the reputation for method which Germany holds among scientific workers. The *Botanisches Centralblatt* (vol. lxxix.) has a most elaborate series of indexes, twenty-three in number, each arranged under authors' names; these occupy 13 pages.

The *Nuovo Giornale Botanico Italiano* and its adjunct the *Bullettino* give only a list of papers under authors' names alphabetically arranged; that is to say, there is no index. *Malpighia* is in like case; and so is the *Annuario del R. Istituto Botanico di Roma*, except that in this the authors are not even arranged alphabetically.

A comparatively recent practice, which originated, if I am not mistaken, in this Journal for 1885, and is now generally adopted, is the indication (by the addition of an asterisk or by difference of type) of novelties—whether genera, species, varieties, or new combinations—published in the volume. This is manifestly a convenient method, and should be universally adopted.

In connection with this subject, a word may be said as to the indexes of systematic works. Considering how small the point is, it is remarkable how much inconvenience is caused by not printing the name of the genus at the head of each column, even when it is continued from the one preceding. This is omitted in Nyman's *Conspectus*, to the great detriment of ready reference. In the two Floras of Africa, now issuing at Kew under the same editorship, the name is given in one and omitted in the other. This apparently arises from the following with Chinese exactness the method adopted in the earlier volumes of each work; which, however, does not seem to have prevented the introduction of the new plan of spelling adjectival forms of proper names with a small initial letter. In the general index to the *Flora of British India* the preferable mode was adopted, although to the single volumes the indexes were printed in the criticized form. The maximum inconvenience is supplied in the *Hand-list of Trees and Shrubs* drawn up at Kew, where a page often begins, without any heading whatever, in the middle of the synonymy of a species!

The question of headings to pages is closely allied to that of indexing, and shows a like variety. In periodicals the plan of giving the name of the magazine on the left-hand page, and that of the article on the right, is undoubtedly the best; but the number of periodicals which have nothing at the head of the page is remarkable, including as it does the Kew *Bulletin*, the *Memoirs of the Torrey Club*, *Botanische Zeitung*, *Flora*, *Botaniska Notiser*, and *Oesterreichische Bot. Zeitschrift*. In the *Annals of Botany*, the *Bulletin of the Torrey Club*, *Malpighia*, *Journal of the Linnean Society*, *Giornale Botanico Italiano*, and others, the names of author or articles head *each* page, the name of the periodical being omitted. In systematic works, the plan adopted in the British Museum and Kew systematic publications of indicating at the head of each page the genus as well as the order under treatment adds greatly to the facility of consultation. In some important works, however—*e. g.* Prof. Engler's *Pflanzenwelt Ost-Afrikas*—the pages have no heading of any sort.

My object in calling attention to these apparently trivial matters is to save future workers the unnecessary expenditure of time and trouble which their neglect has occasioned, and is occasioning to the present generation of botanists. The reforms advocated are neither unreasonable nor difficult of execution, and it is confidently hoped that, in some quarters at least, they will receive favourable consideration.

James Britten.

SHORT NOTES.

Octodiceras Julianum in Britain.—I am pleased to record from two Worcestershire localities the very singular and interesting *Octodiceras Julianum* Brid., a moss not hitherto recorded from any British station. This has been found by my enthusiastic and painstaking friend Mr. J. B. Duncan, of Bewdley, in two different localities, and in fair abundance near Stourport. Mr. Duncan says: "The moss is evidently quite aquatic, and, judging from its development, is well established; the two localities where I gathered it are over a mile apart; the plant was growing on a piece of natural timber along with *Fontinalis* and *Eurhynchium rusciforme*, and just covered with water." The plant naturally puzzled my friend, as its first look is that of a *Fissidens*, and it might be mistaken for a very small narrow-leaved variety of *F. polyphyllus*; but under the microscope the very short inferior lamina and truly different areolation at once decide its distinctness, and my determination of the plant has been confirmed by Mr. H. N. Dixon. There appears to be no reason why this plant should not be found in many British streams, and it has probably been overlooked from the fact that it has very much the look of a *Fontinalis* when growing. It is found more or less frequently over the greater portion of Europe, in Canada, and the United States. Schimper and Husnot describe it as growing on stones in water, but Mr. Dixon kindly informs me that Limpricht says that on the Continent it is found growing on tree-roots, &c., in water as well as on stones. Lesquereux and James, in their *Manual of the Mosses of North America*, say, "on stones and branches in wooded creeks and swamps." The following description may be useful to some:—

Plants slender, filiform, fasciculate-ramose, branching from innovations the whole length of the stem, or from the base only, floating. Leaves distant, linear-lanceolate, short-auriculate, the lamina ending at the auricles and three times as long. Flowers monœcious, terminal, on more or less elongate branchlets, the male axillary sometimes aggregate; perigonium of two or three leaves; fruits (cladogenous) on young shoots. Calyptra nearly black, erose or lacerate at base; capsule oblong-ovate, greenish, soft, red at orifice, gradually narrowed to a short green pedicel, very fragile at the base, lid as long as the capsule, teeth short, irregularly laciniate or perforate above the middle, yellowish at base, pellucid. J. E. Bagnall.

New Worcestershire Carices.—The recent spell of dry weather has afforded good opportunity for the getting of sedges and other water plants; and it has been gratifying to find in a damp copse only four miles from the centre of Birmingham, and just within the Worcestershire boundary, *Carex lævigata* Smith, which has not previously been recorded for the county, and it is also very rare in Warwickshire. It was kindly named by Mr. Arthur Bennett. Growing near it are fine patches of *C. vesicaria* and a quantity of *C. strigosa*, which is rare in Worcestershire and absent from Warwickshire. The following species can also be found in different parts of the copse, viz. *C. Pseudo-cyperus*, *rostrata*, *vulpina*, *remota*, *Goodenowii*, and *sylvatica*. Part of this wood is, alas! being used as a tip for rubbish by the Birmingham Corporation; but bushes of "guelder rose" and raspberry and the white flowers of *Rubus suberectus* still adorn the greater portion; and *Equisetum sylvaticum* is spread over a considerable area, with *E. limosum* in two of the pools, and a great mass of *Viola palustris* hard by. At Stanklin Pool, near Kidderminster, *Carex Ehrhartiana* (Hoppe) is to be found in a boggy part of the pool, growing with the type *C. teretiuscula* Good., and interspersed with *C. rostrata*, as at Sutton Park. It is a new locality for both these sedges, and an interesting extension of the present range of the little-known form called *Ehrhartiana*. I understand, however, that the latter is now looked upon as merely a *state* of the true type, with which opinion I should myself concur.—H. Stuart Thompson.

Carex depauperata near Bristol. — In May, 1888, I gathered what I thought was a young specimen of *Carex sylvatica* in Leigh Wood, on the Somerset side of the Avon; but, observing recently its resemblance to an immature form of *C. depauperata* Good. (= *C. ventricosa* Curtis) from Mr. Arthur Bennett, I sent my Bristol plant to him, and he agrees that it is *depauperata*. Mr. J. W. White tells me that it has not been seen at its old station near Axbridge, on Mendip, for many years; so the appearance of this very rare sedge in a fresh locality in North Somerset is of some importance. H. Stuart Thompson.

Ulex nanus in the Isle of Man. — Mr. L. Watt, of Clydebank, has sent me a specimen of undoubted *nanus* from West Douglas Head. He says: "This is the *Ulex* that is common all over from

Douglas Head to Snaefell, and from Port Erin to Ramsay." This being so, the doubt I expressed (p. 212) is answered. — ARTHUR BENNETT.

GALIUM SYLVESTRE IN OXFORDSHIRE.—This plant, which does not seem to have been recorded for Oxfordshire, was found during a recent excursion of the Toynbee Natural History Society, in chalk-fields near Bottom Farm, a few miles west of Henley-on-Thames.— G. L. BRUCE.

NEW YORKSHIRE HEPATICS. — On May 4, 1901, on Coatham Marshes, North-east Yorkshire, I found a large patch of *Mörckia hibernica* covered with capsules, and in such fine condition that Mr. Pearson says he has seen no specimens like it. From a distance the patch had the appearance of *Pellia epiphylla* with its long and crowded silvery setæ. On washing out the *Mörckia*, I found a few plants of *Petalophyllum Ralfsii* (Wils.) Gottsche, with young fruit, and quite distinct from the *Mörckia* by the fan-like frond with lamellæ on the upper surface. It is interesting to add these two hepatics from the east coast of Britain. Mr. Pearson says the *Petalophyllum* is one of the most important discoveries amongst the Hepaticæ of recent years.—WM. INGHAM.

CARDAMINE IMPATIENS IN MIDDLESEX. — The existing records for this plant in Middlesex are old ones, and their correctness is doubted by Trimen & Dyer in their *Flora*, and apparently in *Topographical Botany*. It still occurs in the county, and with every appearance of being indigenous; I found several plants in June last on the bank of a stream in the Harrow district.—P. WHICHELMORE.

THE PLATES OF 'ENGLISH BOTANY,' ED. III. — Is it possible to ascertain who drew the plates first published in the third edition of *English Botany?* As is well known, fresh details were added to some of the original plates, while in some instances fresh plates were substituted for those of the earlier editions. Messrs. Bell & Sons, who bought the book from Mr. Hardwicke's assignees, have no information on the subject. It would be of interest to place the information on record, and possibly some reader may be able to supply it.—JAMES BRITTEN.

NOTICES OF BOOKS.

Species Genera et Ordines Algarum . . . auctore J. G. AGARDH. Vol. III., pars 4: supplementa ulteriora et indices sistens. Lund: Gleerup. 1901. 8vo, pp. 148.

THE last work we are ever to receive from the pen of Prof. J. G. Agardh has just been published—the final supplement to his famous *Species Genera et Ordines Algarum*. This work was begun, as is well known, in 1848, and in 1880 the second part of vol. iii. appeared. Eighteen years later the third part was published, coming as a surprise to phycologists, for many other papers had appeared in the interval, and it was supposed that the *Species Genera et Ordines* had been finished. Now comes the fourth and final part as a last supplement, and with it an index, which not only refers to the last few parts and also to the Analecta and other works on *Florideæ*.

The first division of this volume deals with the affinities of the *Florideæ* and the views of authors on the connection between this group and representatives of lower groups of algæ. This is followed by (ii.) a treatment of the genus *Callophyllis*, giving the characteristics of the subdivisions into which the species fall, with notes on certain plants and on the work of other authors. A short note on (iii.) *Microcœlia* follows, and another (iv.) on *Champia*. *Chylocladia catenata* forms the subject of division v., being placed by the author in a subdivision *Endodictyon* of the genus *Chylocladia*.

The next division (vi.) consists of a lengthy treatment of *Gracilaria*, which genus he divides into four main groups—*Macrocystideæ*, *Microcystideæ*, *Platycystideæ*, and *Plectocystideæ*, depending on the size and position of the thallus cells as seen in transverse section. Sixty-one species are enumerated, including more than one that is new. Two new species of *Curdiæa* are next described (vii.), one from Australia, collected by the late Miss Hussey, and one from New Zealand, sent by Mr. R. M. Laing.

Division viii. treats of plants which have been placed under *Nizzophlea* and *Dasyphlea*; followed by further details on *Endogenia* (ix.), a new genus described in Analecta, Continuatio iv. Another new genus, *Husseya*, is next described, allied to *Chondria* (x.). It contains one species, *H. australis*. A third new genus is founded in xi., *Microgongrus*, allied to *Rhodymenia*, the species for which it was created being *M. phyllophoroides*, from Australia. The last section of this work (xii.) is devoted to a few remarks on certain species of *Florideæ* which are somewhat ambiguous—*Cordylecladia conferta*, *Delesseria Bartoniæ*, *Thysanocladia oppositifolia*, *Grateloupia acuminata*, and *Grateloupia gigantea*.

The index referred to above concludes this book, three-fourths of which were seen in type by the aged author, whose untiring energy and wide knowledge have done so much for the study of phycology.

E. S. B.

Morphology of Spermatophytes. By John M. Coulter, Ph.D., and Charles J. Chamberlain, Ph.D. 8vo, pp. x, 188, with 106 figures. Appleton & Co. New York. Price not stated. 1901.

The title of this book is misleading. As it stands on the shelf it shows only the comprehensive statement "Seed-plants." But though we may condone a somewhat brief and vague statement on the back of a book, we expect the title-page to give a fair indication of its contents. The preface does not help, but the "Contents" inform us that the present volume is Part I., and deals only with Gymnosperms, the incomparably larger group of Angiosperms being presumably left for future treatment. Certainly the Gymnosperms afford scope enough and to spare for one book, and we should welcome a more emphatic separation than is expressed by the view which regards these and the Angiosperms as merely subdivisions of one of the great divisions of the plant-world. Robert Brown got as far as that nearly a century ago when he recognized the importance of the difference between an ovule on an open carpel and ovules enclosed within an ovary chamber. But from Hofmeister onwards the tendency of research has been to widen the gulf between the two subdivisions of seed-plants, and to indicate that in the Gymnosperms we have a group, perhaps more than one group, which should rank as a plant-division of equal value to Pteridophyta, holding a position between the fern-plants and the flowering-plants proper. Messrs. Coulter and Chamberlain might well have seized the opportunity afforded by the publication of a book which recapitulates the results of recent work, and more than any other emphasizes this position, to recognize that position by a distinctive group name. Part II. of a work on the same lines is at present an impossibility. There is much, very much more to be done on the gametophyte stage of the life-history of the Angiosperms before a volume companion to the one before us can be written.

As regards the book under review, it is an excellent and authoritative summary of the general morphology of the Gymnosperms. These are considered as including four series—*Cycadales*, *Ginkgoales*, *Coniferales*, and *Gnetales*. The second comprises the monotypic genus *Ginkgo*, the characters of which, as striking and peculiar as its name, justify its separation from the Conifers as a distinct group. Anatomical details are referred to only where they bear directly upon the general character of the groups; the work does not profess to be a text-book of anatomy. Cytological details in the gametophyte stage are, on the other hand, very fully described. Nor is the treatment, except for broad distinctions, a systematic one. Genera in each series are referred to as illustrating points in morphology, but the subdivision of the series is barely touched upon.

Briefly we have here a book which gives just what a student has hitherto been unable to get in a single volume—an intellectual gymnospermous repast almost as perfect, from the points of view selected, as was possible at the time of publication, and set forth as regards typography and illustrations in quite the best neo-American style. Many of the figures are new, occasionally embodying the result of researches hitherto unpublished, as, for instance, in the case of some of those describing the cytology of the gametophyte in the Conifers.

The authors draw attention to an unusual limitation which they adopt of the two stages in the life-history of the plant. They regard the history of the sporophyte as closed with the appearance of the spore mother-cell rather than with that of the spore. "This has seemed to us to be the best defined line of demarcation between the two generations, both on account of the reduction division, and because preceding this division the mother-cell passes into a more or less prolonged resting condition. It certainly represents the greatest break in the continuity of the life-history." The seed teaches that a prolonged resting condition is no argument for or against a morphological dividing line in life-history. But my colleague Mr. V. H. Blackman, who has kindly looked through the book with me, seems to favour this putting back of the gametophyte stage. In their account of the male gametophyte in the Cycads, the authors point out that the relation between the ciliated sperm-cells of the Cycads and those of the Fern-plants is rather biological than morphological, as each corresponds to the mother-cell of a fern antherozoid and not to the ciliated male cell. They are therefore identical with the so-called male cells of all ordinary seed-plants, being peculiar only in the possession of cilia. The contrast with Pterodophytes, where each mother-cell organises and discharges a ciliated sperm-cell, is a sharp one.

The bibliography at the end of each chapter is useful; we are, however, surprised to find no reference to Dr. Masters's work on the morphology and taxonomy of the *Cruciferæ*.

We regret that we can give no information as to the price of the book, the more so as it is one which the advanced student should read. It is difficult to understand the extreme modesty of some publishers in refraining from obtruding the price of a book on the reader.

A. B. R.

Recent American Papers on Fungi.

In America, even more than in this country, cultivated plants are subject to epidemics of disease caused by parasitic fungi. An account of one of these pests that attacks the violet has been published by Mr. P. H. Dorsett in Bulletin No. 23 of the U.S. Department of Agriculture. The violet disease is due to a hyphomycetous fungus, *Alternaria Violæ*. The plants are attacked on any part and at any stage, but it is the growing leaves that suffer most. They are much disfigured by the spots and blotches caused by the fungus, and often entirely killed. The disease has in many places seriously checked the culture of violets. Mr. Dorsett suggests preventive measures, as fungicides are found to be ineffective. The illustrations from photographs are very good.

Dr. Herman von Schrenk published last year a report on some of the fungi that grow on red cedar, *Juniperus virginiana*; he has recently issued in Bulletin 25 the preliminary results of his studies on some of the diseases of New England conifers caused by fungi of the group of *Polyporeæ*. Most of them are well-known enemies of European foresters, but in the great untended woods of America they work more damage than they are allowed to do here. One of the most troublesome and the most difficult to stamp out is *Polyporus Schweinitzii*, which fastens on the roots, and spreads underground from tree to tree; the fruiting bodies are at first produced on the ground, and finally on the trunk of the tree. The other members of the group that he describes—*P. pinicola*, *Trametes Pini*, &c.—are wound parasites; they gain entrance by broken branches, or through the holes caused by insects and woodpeckers. Where conditions are favourable to their growth, they very soon destroy the tree. The value of the report is greatly enhanced by photographs and drawings.

Mr. Erwin F. Smith has given us, in Bulletin No. 26, an account of Wakker's hyacinth germ, *Pseudomonas Hyacinthi*, which causes a disease of hyacinths known as "the yellow disease," or "Wakker's disease." Mr. Smith has followed Wakker in his investigation, and has confirmed the bacterial nature of the disease by a long and careful series of cultures and innoculations of healthy plants. The microbe, he tells us, "enters the plant through wounds, and multiplies in the vascular system, filling the vessels, especially those of the bulb, with a bright yellow slime consisting of bacteria." Gradually the whole plant is destroyed, and great loss is caused to hyacinth growers. The disease is confined to the Netherlands. The subject of bacteria causing diseases of plants is occupying more and more the attention of plant pathologists, and all additions to our knowledge are sincerely welcome.

Bulletin No. 27, issued by the same Department, deals with the "Wilt-disease of Cotton, and its control." The disease, which is caused by a fungus that lives in the soil and attacks the roots of the cotton-plant, had been already described by Mr. Erwin Smith in a previous Bulletin. Mr. W. A. Orton has been experimenting on the best methods of combating the disease, and gives the results in this paper. It has been found impossible to kill the fungus by the application of fungicides to the soil, or to the plants attacked. He strongly advises growers to avoid planting cotton on infected soils, and, above all, to choose for cultivation the plants that have been proved to be resistant. Parasitic fungi are curiously selective as to their host, and, for no apparent reason, one variety of a species is preyed upon and another left.

From the New York Agricultural Experiment Station there have been issued recently three Bulletins dealing with parasitic fungi. No. 182 gives the result of experiments with sulphur-lime in the prevention of onion-smut, *Urocystis Cepulæ*, a disease which works much havoc in certain districts in America. The sulphur-lime is sown along with the onion-seed, and the benefit to the onion crops has been very marked. No. 185 discusses an apple-tree canker caused by *Sphæropsis Malorum*. The fungus grows also on pear, quince, and hawthorn. Scraping the bark and whitewashing is recommended as a cure.

An account of the ravages of *Rhizoctonia* occupies Bulletin No. 186. It is a sterile fungus forming a brown mycelium, and occasionally sclerotia. It has been found to be the cause of disease in a large series of plants both in Europe and America. These papers are valuable additions to our knowledge of plant-diseases, and their prevention or cure.

Mr. C. G. Lloyd, of Cincinnati, has been publishing at intervals *Mycological Notes* dealing with the larger fungi, which he is willing to send to all students of these plants, free of charge. The latest of these, issued in Dec. 1900, deals with the Collybias of Cincinnati. Mr. Lloyd pays no regard to tradition in his systematic work; he refuses to cumber the name of the plant with the authority for the species, as, he thinks, by so doing we but minister to the vanity of the species maker; and also he rejects the claims of priority to displace a well-known name. The author writes with much enthusiasm, but not always with care, and so we find such sentences as "we have had opportunity to since observe it rather frequent." Some day, we doubt not, Mr. Lloyd will cite his authorities, and pay attention to his style. He is issuing a series of photographs of Agarics, and, if they are as good as the illustrations of his Collybias, they must be most helpful to students of mycology.

A. L. S.

Les Desmidiées de France. Par Joseph Comère. 8vo, pp. 222, 16 plates. Klincksiek, Paris.

This is a very pretentious volume, as it deals with the Desmids of the whole of France, where the most varied conditions obtain as to habitat, &c. We must confess that we are greatly disappointed with the work. It will serve the purpose of a catalogue of those species hitherto recorded for France; the introductory matter should prove useful to the beginner, and so should the short descriptions of the species to a botanist; but critical remarks concerning allied species, which are of the greatest use to an earnest student, are totally lacking. It is painfully evident that a master of this group of plants is still wanting to France. The number of species of Desmids recorded for the whole of France is some scores less than those on record for the county of Yorkshire alone. The number of localities, too, is very few—much fewer than we should expect from an average English county.

On p. 25 the author writes:—"Une bonne figure vaut toujours mieux pour la détermination des espèces qu'une description si parfaite qu'elle soit." We only wish that the author had given good figures. The drawings are certainly not good; they are crude—many of them very crude—and the faults exhibited are so numerous that it is a difficult matter to determine where to begin and point out a comparatively small number of the more inaccurate figures. We strongly advise M. Comère to examine the figures of a work published on British Desmids fifty-three years ago, and then notice his own figures, issued after five progressive decades have elapsed—in a country, too, which is usually supposed to be much more artistic than Britain. On Pl. xiv., fig. 3 *a* and fig. 3 *b*, two figures are given of one of the most characteristic species—"*Micrasterias furcata*," which certainly belong to the genus, but could not be mistaken for this species by the merest tyro. On the same plate the figure representing *M. Thomasiana* does not show the characteristics of that species, and the outline of *M. Jenneri* is not that of the type. The apices of fig. 1, Pl. i., are not those of *Closterium lineatum*, and we are quite certain that no real *Closteria* exhibit the want of grace and symmetry depicted in many of the figures with which this genus is illustrated. On Pl. vi., fig. 1, a caricature of *Pleurotænium nodulosum* is given which certainly does not agree with the author's description of it. The figures of

Tetmemorus, on the same plate, make one think that French examples are fast deteriorating with regard to symmetry and grace. No attempt is made in the figures on the same plate to show the characteristic feature of the genus *Docidium*. On Pl. vii. a notable characteristic is omitted in fig. 1. Fig. 4 does not represent typical *Cosmarium cœlatum*, and fig. 6 is certainly a wonderful *C. Holmiense*. Fig. 36 *b* will do for the vertical view of a *Staurastrum*, the four angles will not do for any *Cosmarium;* the author had better try again to copy Wille's figure (attributed to Leme in the author's description of this plate). The want of symmetry throughout this plate is striking. Just to refer to two things out of many on Plate viii., fig. 1 is a bad drawing of *Cosmarium pachydermum*, its chief characteristic being omitted, and *C. Brebissonii* always has twice as many papillæ in the periphery as those figured by the author. On Plate ix., fig. 26 *a* certainly does not belong to the same species as fig. 26 *b*. On Plate x., two figures of *Euastrum insigne* are given, whose polar lobes are totally different from those characteristic of this species; and fig. 13 is shocking. On Pl. xi. *Staurastrum verticillatum* is quite wrong, and has obviously been copied from Cooke. On Pl. xv. a figure is given of a species we do not believe in; the author should compare itwith a specimen of *Xanthidium antilopæcum* when the surrounding mucilage is contracting. Fig. 13 is also no representative of mature *X. aculeatum*.

We have not space to comment any further on the drawings; we are however of opinion that neither Messrs. Petit, Gay, Lemaire nor Gomont would have issued such plates as accompany this work. The author does not appear to have had proofs submitted to him, as the spelling of both generic and specific names requires careful revision.

W. W.

DICTYOSIPHON.

A PAPER by Dr. Sv. Murbeck, entitled "Ueber den Bau und die Entwickelung von *Dictyosiphon fœniculaceus* Grev.," appears in the *Videnskabsselskabets Skrifter. Mathem.-naturvid. Klasse*, 1900, No. 7. The author divides his work into the following sections:—Growth, Branching, Thallus Cavity, Conducting and Strengthening Tissue, Assimilative Tissue, Cell-tension, Hairs, Hyphæ, Attachment, Reproductive Organs.

Under these headings the subject has been worked out in great detail, and some facts brought to notice which are interesting in connection with other members of the *Phæophyceæ*. The family of *Dictyosiphonaceæ* is a small one, as defined by Engler & Prantl in *Naturl. Pflanzenfamilien*, consisting only of three genera—*Dictyosiphon*, *Gobia*, and *Scytothamnus*. Of these, the first two are represented in the northern hemisphere, and can therefore be conveniently studied and compared, as is the case in the present paper, by European botanists; the third—*Scytothamnus*—is only recorded from the South Temperate region, and an account of this genus, which it is hoped will soon appear, must gain largely in interest by a study of this examination of *Dictyosiphon* by Dr. Murbeck.

The section describing the strain arising from unequal growth of the innermost and outermost cells of the thallus is perhaps the most interesting, as touching on wider biological questions than can be raised in the other parts of the paper. As the author says, the question of the tension of tissues in marine algæ is a subject of recent study only, and the result shows a marked contrast to the mode of tension in the higher plants. This is of course to be expected in view of the wholly different surroundings of the two groups. Among the algæ, except in the case of those which secrete lime, everything makes for greater flexibility and elasticity, and, even among plants and animals hardened by an outward secretion of lime, there remains, as is shown by Prof. Stewart in his paper on the subject,* uncalcified nodes between each joint, which prevent the plant from becoming so rigid as to cause its destruction from the movement of the water. It is obvious that in fairly large plants, such as *Dictyosiphon fœniculaceus*, some such elasticity as is described by Dr. Murbeck is necessary for their protection.

The growth of the hairs is fully described and figured, but no new facts are given concerning the use to the plant of these growths, so common among the *Phæophyceæ*. The formation of pits, the consequent enlargement of the surface of the thallus, and Prof. Reinke's theory as to the possible employment of the hairs in abstracting mineral substances from the water, is brought forward, and the experience of the author, in common with others, is shown to be that the more plentiful the hairs, the finer the plant. But which is cause and which effect? When will someone experiment on this point in the growing plant?

The occurrence of hyphæ in *D. fœniculaceus* is here demonstrated for the first time, though they were already known in *D. hippuroides*, The interest lies, however, less in this fact than in the irregularity of their occurrence in the thallus, being found in large quantities in some parts, and in others not at all. The Wille theory as to the connection of hyphæ with the assimilation of CO_2 seems hardly to fit a case like this, and there are also difficulties in the way of regarding them as mechanical supports. A study of allied *Phæophyceæ* is necessary for a solution of this question.

A description of the mode of attachment between *D. fœniculaceus* and *Chordaria*, on which it grows, shows an ingenious intermingling of the two plants at the point of junction, and it would be interesting to study the mode of attachment of other members of the family, or of this one on other hosts.

---

* *Cat. Comp. Anat. R. Coll. Surgeons*, i. 54.

*ARTICLES IN JOURNALS.**

Bot. Gazette (18 May).—H. N. Whitford, 'Genetic development of forests of N. Michigan.'—E. W. D. Holway, 'Mexican Fungi.'—G. M. Holferty, 'Ovule and embryo of *Potamogeton natans*' (2 pl.).

Bot. Zeitung (1 June).—L. J. Celakovský, 'Die Gliederung der Kaulome' (1 pl.).

Bull. de l'Herb. Boissier (31 May). — A. de Candolle, 'Plantæ Madagascarienses ab Alberto Mocquerysio lectæ.' — H. Christ, '*Elaphoglossum Bangii*, une fougère ancestrale.'—K. Müller, 'Monographie der Gattung *Scapania*.' — C. Meylan, 'Catalogue des Hépatiques du Jura.' — G. Beauverd, 'Dissémination des graines par le vent.'—G. Hegi, 'Das Obere Tösstal.'

Bull. Soc. Bot. France (vol. xlviii, 1, 2; June).—M. de Vilmorin, 'Armand David' (1826–1900).—E. Bescherelle, 'Flore bryologique de Tahiti.'—J. Comère, 'Diatomées récoltées à St. Jean de Luz.'—E. Bornet, 'Gaspard Adolphe Chatin' (1813–1900; portr.). — L. Geneau de Lamarlière, 'Contribution à la Flore de la Marne.'—L. Lutz, 'Additions à la Flore de Corse.'—D. Clos, '*Sonchus lacerus*.'

Bull. Torrey Bot. Club (21 May). — H. M. Richards, '*Ceramothamnion Codii*' (gen. nov.; 2 pl.). — P. A. Rydberg, 'Rocky Mountain Flora.' *Piperia*, gen. nov. orchid. (= *Montolivæa* Rydb.). — E. A. Burt, '*Tremella mycetophila*' (1 pl.). — A. Eastwood, *Paronychia Franciscana*, sp. n. — J. K. Small, 'Shrubs and trees of Southern States.' — B. L. Robinson, 'Further notes on the Agrimonies.' — H. H. Rusby, 'Plants collected in S. America, 1885–6' (contd.).

Gardeners' Chronicle (25 May).—*Tulipa Wilsoniana* (fig. 121).—(1 June). *Malortiea Koschnyana* Wendl. & Dammer, sp. n. — C. T. Druery, 'Truncate Ferns.'—(15 June). 'Thomas Meehan' (portr.). (22 June). M. Foster, '*Iris Ewbankiana*, sp. n.' (fig. 152).

Journal de Botanique (April; received 28 May).—C. Sauvageau, 'Les Sphacelariacées' (cont.).—H. Hua & A. Chevalier, 'Les Landolphiées du Sénégal,' &c. (concl.). — C. Gerber, 'La respiration des Olives' (concl.).

Malpighia (xiv. fasc. 9–12; dated 1900, received 5 June). — O. Mattirolo, 'Sulla importanza pratica della Botanica scientifica.'—G. Lopriore, 'A. B. Frank' (1839–1900; portr.).—Id., '*Amarantaceæ* novæ.'—A. Fiori, 'Nuovo microtomo automatico.'—G. B. Traverso, 'Micromiceti de Tremezzina.'—A. Piccone, 'Noterelle Ficologiche.' Id., 'Flora marina del Mar Rosso.'—A. Béguinot, '*Carex Grioletii*.'

Oesterr. Bot. Zeitschrift (May and June; received 19 June).—E. Häckel, 'Neue Gräser.' — M. Soltokovic, 'Die perennen Arten der *Gentiana* aus der Section *Cyclostigma*.'—(May). O. E. Schulz, 'Zur geographischen Verbreitung des *Melilotus polonicus*.' — V.

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Schiffner, 'Einige Materialism zur Moosflora des Orients.' — (June). A. Burgerstein, 'A. V. Kerner's Beobachtungen über die Zeit des Oeffnens und Schliessens von Blüten.' — J. Vilhelm, 'Neue teratologische Beobachtungen an *Parnassia palustris*.' — J. Dörfler, *Centaurea Halacsyi*, sp. n.

Rhodora (20 May).—F. Lamson-Scribner & E. D. Merrill, 'New England Panicums.'—F. O. Collins, 'Notes on Algæ.'—A. Rehder, 'Hybrids of *Quercus ilicifolia*' (1 pl.). — (June). Botany of Mount Katahdin.—J. F. Collins, 'Bryophytes of Maine.'

BOOK-NOTES, NEWS, &c.

We have received from Mr. Upcott Gill the second and concluding part of the *Century Supplement to the Dictionary of Gardening*, of which the earlier portion was noticed on p. 43. We have already expressed our opinion of the merits and demerits of the work, the former of which greatly outweigh the latter. The coloured plate of daffodils, which faces the ugly title-page, is a disfigurement rather than an ornament to the book—a criticism which applies to several of the illustrations in the text—and is made uglier by the blue lettering employed; and some of the information given—*e. g.* as to the apparatus used for "spraying"—reads like an advertisement. We note many references—*e. g.* under *Quercus*— to the discrepancies in nomenclature between the "Kew Hand-list" and the *Index Kewensis*.

It is announced that Prof. C. E. Sargent's *Silva of North America* will be supplemented by two extra volumes, containing plates and descriptions of trees added during the last ten years to the region covered by the work. The new volumes will contain 115 plates, and will be published next spring.

Messrs. W. & G. S. West are issuing in the *Transactions* of the Yorkshire Naturalists' Union a localized list of the freshwater algæ of the county. A hundred pages of the list, embracing 470 species and many varieties, have already been issued, this being less than half the number to be recorded. Many species are recorded for the first time in Britain. The authors give those synonyms which they consider will be useful to future workers, and they express a hope that the list "will be deemed worthy to form an acceptable and substantial basis-list, serving as a useful guide to future workers both in the matter of the classification of these plants and in the species they may expect to find." Judging by the numerous localities under a large number of the species, much of the ground seems to have been well worked. It is probably the most complete list of fresh-water algæ ever issued for any district.

The first part of vol. viii. of the *Flora of Tropical Africa* has been issued. The following botanists have contributed: Mr. N. E. Brown (*Pontederiaceæ, Xyrideæ, Aroideæ*); Mr. C. B. Clarke (*Commelinaceæ*); Mr. J. G. Baker (*Juncaceæ*); Mr. C. H. Wright (*Palmeæ* and *Pandaneæ*). The genus *Zyganthera* N. E. Br. is established on Engler's figure and description of *Pseudohydrosme Büttneri*.

A NEW part (vol. iii. part 2) of Mr. J. M. Wood's *Natal Plants* contains figures and descriptions of twenty-five South African species, among which are some well-known and other more interesting plants—e. g. *Strychnos Henningsii* Gilg., *Olea Woodiana* Knobl., *Gladiolus inandensis* Baker.

IN the new part (cxxv.; issued May 15) of the *Flora Brasiliensis*, Prof. Cogniaux continues his enumeration of the *Orchidaceæ*. We note under the species of *Cattleya* an extensive enumeration of the apparently interminable florists' varieties: the synonymy of *C. labiata* alone occupies about twenty closely printed columns!

Biltmore Botanical Studies is the most recent addition to the list of American periodicals. The first number is dated April 8, 1901; it will be "issued at irregular intervals"—a phrase which might be added to the title of certain periodicals nearer home—and is described as "a Journal of Botany embracing papers by the Director and Associates of the Biltmore Herbarium." The papers in the present issue are careful pieces of work; they comprise a paper on *Cratægus* by the Director, Mr. C. D. Beadle, in which twenty-one new species are described; the large crop of North American novelties in this genus at present leads us to express a hope that the old types are sufficiently understood. With Mr. F. E. Boynton Mr. Beadle gives a revision of *Marshallia*, illustrated by eleven plates, and with Mr. C. L. Boynton discusses certain species of *Rudbeckia*. A paper on "new or little-known species of *Trillium*" is contributed by Mr. T. G. Harbison. Messrs. Wesley & Son are the London agents for the periodical; the price of the present number is fifty cents.

THE "Minutes of Evidence taken before the Departmental Committee on Botanical Work and Collections at the British Museum and at Kew with Appendices and Index to accompany the Report presented to the Lords Commissioners of His Majesty's Treasury dated 11th March 1901" have been printed, but have not yet, we believe, been published.

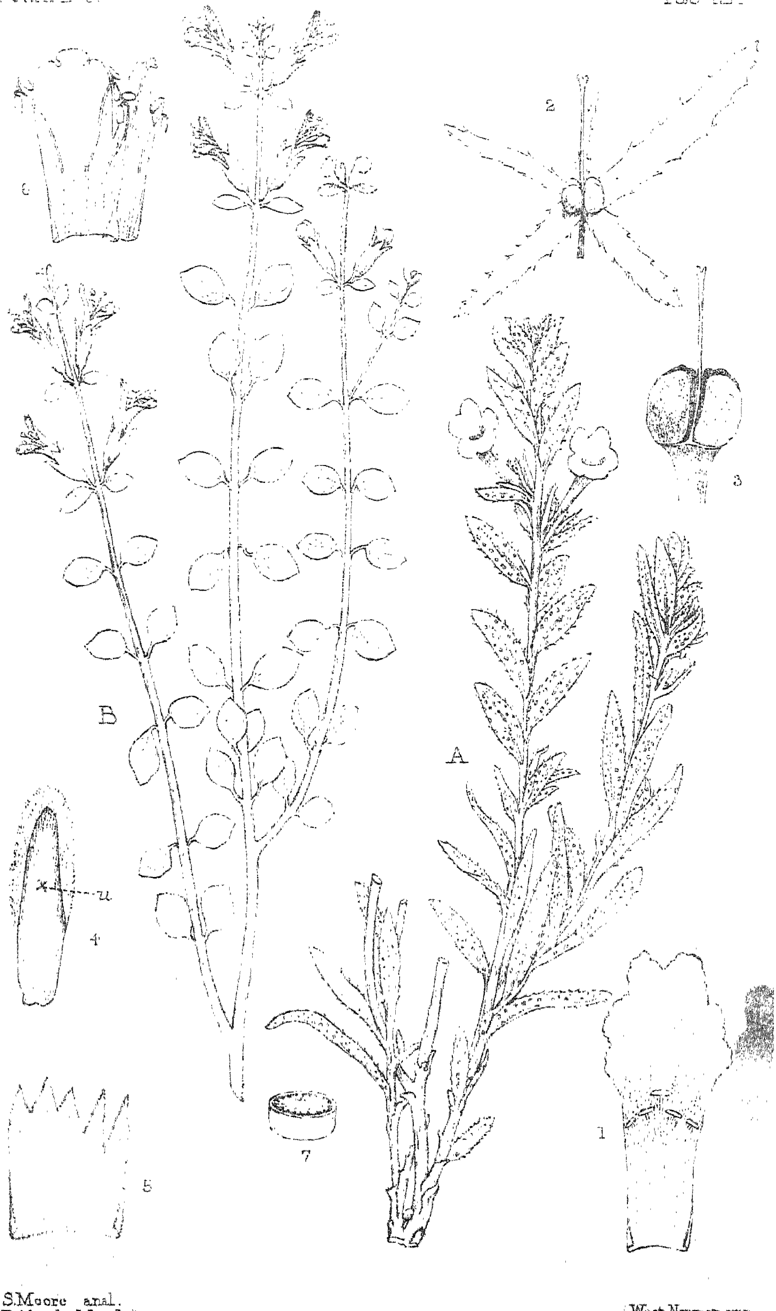
THE new part (dated 21 June) of *Das Pflanzenreich* is devoted to a Monograph of the *Monimiaceæ* by Miss Janet Perkins and Dr. Gilg. In *Die Natürliche Pflanzenfamilien* the Mosses are continued; the latest instalment contains the Andræales and Bryales, by Dr. Brotherus and W. Ruhland; and the *Dicranaceæ*, for which Dr. Brotherus alone is responsible.

THE accuracy in general matters for which the *Daily Mail* has long been conspicuous, extends to its botanical information. We reproduce the most recent item in the hope that the publicity now given to the methods of the "professional botanist" will cause him to abstain from this nefarious means of adding to his income:—

"Four of the daintiest of English wild plants are rapidly disappearing from this country, and one, at any rate, can rarely be seen outside Kew Gardens. This is the Cypripedium calceolus, commonly known as the 'lady's slipper.' It is really a wild orchid, with a pretty yellow flower resembling in shape the article which has given it its popular name. The other vanishing plants are the Osmunda regalis, the Scolopendrium vulgare (hart's tongue), and the Asplenium veride (green spleenwort), all of which are ferns. Their disappearance is due to the depredations of the tourist, especially of the cyclist, and the professional botanist, who scours the woods and disposes of his 'finds' for a few pence in the streets of the nearest large town."—*Daily Mail*, June 26.

There can, however, be little doubt that, apart from the ravages of "professional botanists" and the destructive efforts of various local bodies, who throughout the country are engaged in destroying grassy roadsides and scarifying hedgebanks, to the great advantage of the nettles, docks, and other weeds which take the place of the native vegetation, our British plants are threatened with a new danger. We entirely associate ourselves with the protest printed by Professor L. C. Miall in the *Times* of June 3, which we reproduce in the hope that our readers may, in their respective localities, join in opposing any similar proposition that may be made. Prof. Miall writes:—

"I have before me the programme of the Essex Technical Instruction Committee for Field Studies in Natural History. The course for 1901 is intended to instruct teachers in the elements of botany by means of rambles in search of wild flowers. One leading feature is a vacation course of ten days in the New Forest. The teachers are to be accompanied by local guides, and their attention is particularly directed to the rarest species, which are specially named, as well as the places in which they are known to grow. To collect, dry, and identify plants is the chief aim of the leaders, who not only urge every teacher to make his own collection, but suggests that duplicate plants will prove useful for 'special fascicles.' It would not interest many of your readers to discuss at length the educational value of such a programme. It seems to me lamentable that teachers should be advised to study natural history by schedules, and to gather plants merely in order to name and dry them. I imagine that they will be worse and not better for working through so dry and barren a course. Nothing shows the want of judgment of the promoters more clearly than that untrained botanists should be seriously advised to pay particular attention to the difficult and uncertain subspecies of the common bramble. But all of us, whether we are concerned with the teaching of botany or not, have an interest in the preservation of our native plants. The Essex Committee is simply organizing a raid upon plants which are already near to extinction. I hope that they will fail to discover the rarities which they selfishly covet; their enterprise is, I venture to say, an injury to natural history and to education alike. It may not be too late to get this programme cancelled, and I would beg those who care for live natural history to use their influence in diverting the attention of the Essex collectors to some other pursuit where they will do less harm."



S.Moore anal.
B.Alcock del. et lith.
West, Newman imp.

A. Leurocline lithospermoides. B. Omania arabica.

ALABASTRA DIVERSA.—PART VIII.

By SPENCER LE M. MOORE, F.L.S.

(PLATE 424.)

Leurocline,

Borragineurum e subtribu *Lithospermearum* genus novum (tab. 424 A).

Calyx alte 5-partitus, segmentis liberis angustis inter se inæqualibus postico revera minore persistentibus. Corollæ tubus cylindraceus, faucibus ampliatis intus nudis; limbus 2-labiatus, labio superiore erecto breviter 2-lobo, labio inferiore breviter 3-lobo patente. Stamina 5, faucibus inserta, inclusa; filamenta brevissima; antheræ oblongæ, obtusæ. Ovarii lobi 4, gynobasi planæ inserti; stylus filiformis; stigma breviter 2-lobum. Nuculæ sæpissime 4, trigonæ, tuberculatæ, areola plana basilari gynobasi planæ affixæ. Fruticuli parvi, ramosi, hispidi vel verrucati. Folia alterna. Flores mediocres, ex axillis superioribus solitatim oriundi.

This genus has all the characters of *Echiochilon*, except that the stamens are inserted in the throat of the corolla, and, its principal *raison d'être*, that the nutlets are fixed by a flat base to a flat (not conical) gynobase. In this latter character, as also somewhat in habit, it resembles *Lobostemon*, from which it differs in having an irregular calyx with small posticous lobe, a distinctly zygomorphic corolla, included stamens and bilobed stigma. Its position in the order, as understood by Bentham in the *Genera Plantarum*, seems to be next *Sericostoma*, from which, however, it is separated by several important characters.

Leurocline lithospermoides, sp. nov. Caule stricto mox ramoso, ramis foliosis erectis rigidis glabris, foliis sessilibus lineari-oblongis obtusis vel obtusissimis supra glabris subtus marginibusque pilis brevibus hispidis basi albo-verrucatis obsitis, pedicellis subnullis, calycis ampli segmentis a corollæ tubo superatis linearibus vel lineari-lanceolatis acutis hispidis segmento postico nunquam evanido, corollæ tubo juxta medium coartato limbi dilatati lobis rotundatis undulatis, stylo incluso, nuculis obtusis.

Hab. British East Africa, Leikipia, June, 1893; *Dr. J. W. Gregory*. Gof, 3900 feet, and between Lé and Tocha, 1898; *Lord Delamere* (Herb. Mus. Brit.).

Planta usque ad 25·0 cm. alt., sed sæpe humilior. Folia 1·0–2·0 cm. long., modice 0·25–0·3 cm. lat. Calyx modicus circa 0·8 cm. long., nonnunquam vero longior vel etiam brevior; tubus brevissimus, intus albide hirsutus; lobus posticus ± 0–25 cm. long., lobi reliqui inter se inæquales et ± 0·5–0·7 cm. long.; calyx fructifer parum auctus. Flores cærulei. Corollæ tubus extus glaber vel obscure pruinosus, intus sursum pilosus, 0·85 cm. long., basi vix 0·2 cm., medio 0·1 cm., faucibus circa 0·3 cm. diam.; limbus 0·6–0·8 cm. diam.; labium anticum 0·3 cm., posticum 0·4 cm. long. Filamenta circa 0·05 cm. long., posticum quam

reliqua paullo altius affixum; antheræ vix 0·1 cm. long. Stylus crassiusculus, glaber, 0·35 cm. long. Nuculæ rubescentes, 0·2 cm. long., vix totidem diam.

The variation in the size of the calyx from flower to flower is a point worth mention.

I am of opinion that *Lobostemon somalensis* Franchet (Revoil, *Faune et Flore des Pays Comalis, Sertum Somalense*, p. 44) must be referred to this genus. In assigning to *Lobostemon* the plant studied by him, the excellent French botanist just named was doubtless swayed by the flat insertion of the nutlets upon a flat gynobase. Thanks to the courtesy of M. Jules Poisson of the Paris Museum, I have been able to examine a few fragments of Revoil's specimen, which, though they prove erroneous what I had supposed might be the case—namely, that the plant above described was identical with *Lobostemon somalensis* Franchet—yet are sufficient, taken together with M. Franchet's description, to convince me that the latter is not a *Lobostemon*. The only point about which information is not forthcoming relates to the stigma of the supposed *Lobostemon*; but even if that organ have not the structure we find in *Leurocline lithospermoides*, the character of the new genus might be modified in accordance without doing violence to the general principles underlying the classification of the order. The differences between the two species may then be summed up thus:—

Planta verrucata. Folia lanceolato-ovata, nec ultra 1·0 cm. long. Calyx fere omnino glaber, 0·5 cm. long. Nuculæ acutæ .	*L. somalensis.*
Planta hispida. Folia lineari-oblonga, usque ad 2·0 cm. long. Calyx hispidus, saltem 0·75 cm. long. Nuculæ obtusæ . . .	*L. lithospermoides.*

Dr. Gürke (Engler & Prantl, *Pflanzenfamilien*, iv. 3a, s. 128) appears to have overlooked the alleged extension of *Lobostemon* into the northern hemisphere.

Omania,

Scrophulariacearum e tribu *Euphrasiearum* genus novum (tab. 424 B).

Calyx tubulosus, 5-angulatus, aliquantulo bilabiatus, labio superiore trilobo inferiore bilobo. Corollæ tubus sursum breviter amplificatus; limbus bilabiatus, labio postico erecto concavo emarginato marginibus revolutis, labio antico majori trifido bigibboso æstivatione externo. Stamina 4, didynama; antheræ leviter exsertæ, inter se æquales; loculi discreti, stipitati, obtusi, omnes polliniferi. Stylus filiformis; stigma capitatum, obscure bilobum. Ovula in loculis indefinita. Capsula ——. Suffrutex ramosus facie *Lindenbergiæ*. Folia parva, opposita, integra. Flores breviter pedunculati, ex axillis foliorum superiorum orti. Bracteolæ 0.

Omania arabica, sp. unica. Ramis ascendentibus teretibus una cum foliis calycibusque arcte et minute pubescentibus, foliis ovatis obtusis modice 0·5 cm. long. et 0·35–0·4 cm. lat. (summis vero minoribus) petiolis circa 0·2 cm. long. fultis, pedunculis petiolos æquantibus, calyce in toto 0·6 cm. long., hujus lobis anticis lanceolatis 0·3 cm. long., posticis paullo latioribus 0·2–0·25 cm.

long., corollæ extus pubescentis tubo 0·15 cm. diam. et 0·6 cm. long., limbi labiis vix 0·6 cm. long., labio postico lanceolato-oblongo antico latissime oblongo, filamentis attenuatis atratis, antheris oblongis obtusis 0·17 cm. long., disco parvo lobulato, ovario oblongo una cum stylo glabro.

Hab. Oman, Arabia, 1898; *Lt.-Col. A. S. G. Jayakar* (Herb. Mus. Brit.). Muscat; *Aucher-Eloy*, No. 5165 (Herb. Kew.).

At first sight this plant looks extraordinarily like a *Lindenbergia*, in which genus Aucher-Eloy's specimen has long lain at Kew, the sheet marked in Mr. Bentham's handwriting, "Lindenbergia sp. nov.?" Examination of a bud, however, shows clearly that the upper lip is inside in æstivation instead of outside, thus removing the plant from the tribe *Gratioleæ*. But this, although the chief differential character, is not the only one, for a zygomorphic calyx is what we do not find in *Lindenbergia*, and the upper lip of our plant's corolla has reflexed edges just as have the corollas of the *Euphrasieæ*. The proper position of *Omania* I consider to be next to *Bungea* C. A. Mey.

Philippia keniensis, sp. nov. Ramulis minute cinereo-pubescentibus deinde glabris, foliis arcte imbricatis lineari-oblongis obtusis dorso sulcatis viscosis petiolos 4-plo excedentibus, pedicellis quam flores longioribus, calycis lobis 3 ovatis obtusis quarto longiore ovato-lanceolato fere a basi libero, corolla calycis lobo longiori æquilonga anguste campanulata, antheris subinclusis profunde bifidis, ovario subgloboso, stylo angusto satis elongato subexserto, stigmatis lobis 3 brevissimis.

Hab. Mount Kenia; *J. W. Gregory*, 1893; *H. J. Mackinder*, 1899 (Herb. Mus. Brit.).

Ramuli erecti, rigidi. Foliorum lamina 0·4 cm., petiolus 0·1 cm. long. Pedunculi 0·3 cm. long. Flores circa 0·25 cm. diam. Calycis lobi 0·13 cm., lobus impar 0·22 cm. long. Antheræ 0·1 cm. long. Stylus 0·15 cm. long.

A near ally of *P. trimera* Engl., but certainly not conspecific with it on account of its somewhat longer and relatively narrower leaves, the long peduncles, broader calyx-lobes, and different style.

Xysmalobium Schumannianum, sp. nov. Humilis, caule erecto sat valido deorsum tuberoso-dilatato mox ramoso, ramis crebro foliosis angulatis junioribus complanatis lateribus pubescentibus, foliis elongatis subsessilibus linearibus acutis basi parum rotundatis paucis infimis lineari-lanceolatis basi cordatis et quam reliqua manifeste brevioribus omnibus glabris subtus reticulato-venosis nervo mediano maxime eminente, cymis sessilibus paucifloris, pedicellis levissime complanatis quam folia multo brevioribus puberulis, floribus parvis, calycis intus pluriglandulosi segmentis lanceolatis acutis glabratis, corollæ rotatæ tubo subnullo lobis ovato-lanceolatis acutis fere omnino glabris mox reflexis, coronæ squamis gynostegio brevioribus linearibus dorso valde incrassatis ibique lateraliter arcte compressis, gynostegio sessili, stigmate leviter depresso, folliculis ——.

Hab. British East Africa, Machakos; *Dr. S. L. Hinde*, 1896 (Herb. Mus. Brit.).

Planta ex specimine unico mihi obvio 20·0 cm. alt. Caulis pars hypogæa circa 1·0 cm. diam.; pars epigæa adhuc simplex 0·4 cm. diam.; rami 0·1–0·25 cm. lat. Folia modica 5·0–6·0 cm. long. et 0·2–0·4 cm. lat., firme membranacea; petioli circa 0·1 cm. long. Pedicelli 1·0–1·4 cm. long. Calyx 0·3 cm. long. Corollæ lobi 0·45 cm. long., in sicco virides. Coronæ squamæ 0·25 cm.; gynostegium 0·3 cm.; pollinia 0·1 cm. long.

Easily distinguished by reason of the long and narrow leaves, the small green flowers, and the large dorsal thickening to the corona scales.

I have named this in compliment to Professor Karl Schumann of Berlin, who very kindly compared a small piece with types in the botanical museum of the German capital.

Marsdenia spissa, sp. nov. Forsan erecta, caule sat valido subtereti glabro eminenter lenticellifero, foliis petiolatis ovato-oblongis apice breviter cuspidatis obtusis basi rotundatis firme membranaceis glabris, cymis umbelliformibus brevipedunculatis plurifloris ad apicem caulis arcte approximatis, pedicellis flores excedentibus puberulis, calycis segmentis ovatis obtusissimis margine ciliatis glandula unica alternantibus, corollæ rotatæ tubo subnullo lobis ovato-oblongis obtusis membranaceis margine et parte abaxiali crispule pubescentibus, coronæ squamis parvis oblongis obtusissimis crassiusculis basi inappendiculatis gynostegio brevi vix æquilongis, polliniis pyriformibus, stigmate convexiusculo, folliculis ——.

Hab. British East Africa, near Lake Marsabit, 1898; *Lord Delamere* (Herb. Mus. Brit.).

Caulis 0·3 cm. diam., intervallis 1·0–2·0 cm. long. foliigerus. Foliorum lamina 5·0–5·5 cm. long., 3·0 cm. lat., in sicco lutescenti-viridia; costæ secundariæ utrinque 5, costæ omnes subtus prominentes. Pedicelli circa 0·5 cm.–vix 1·0 cm. long. Calycis segmenta 0·2 cm. long., 0·17 cm. lat. Corolla vix 1·5 cm. diam.; lobi 0·55 cm. long. Coronæ squamæ 0·2 cm. long., 0·1 cm. lat. Gynostegium 0·22 cm. long. Pollinia 0·05 cm. long.

The massed cymes, rotate corollas, and short corona scales are among the chief peculiarities of this species.

Parasia (BELMONTIA) **Thomasii**, sp. nov. Herba ascendens, sparsim ramosa, glaberrima, carnosula, foliis sessilibus sæpe breviter amplexicaulibus rotundato-ovatis obtusis brevissime cuspidulatis basi rotundatis vel leviter cordatis, floribus solitariis terminalibus vel ex axillis summis oriundis subsessilibus, calycis ovoideo-oblongi a tubo corollæ bene superati segmentis lanceolatis sat longe acuminatis dorso ala inflata oblonga obtusissima sursum in carinam transeunte enervosa onustis, corollæ hypocrateriformis tubo elongato inferne uniformi superne leviter amplificato limbi lobis late obovatis obtusissimis, staminibus in parte ¾ tubi altitudinis insertis, filamentis brevibus, antheris oblongis glandula oblonga sat magna coronatis et basi glandulis 2 (vel abortu 1) minimis appendiculatis, stylo corollæ tubo semiæquilongo, stigmate oblongo, capsula ——.

Hab. Orange River Colony, 1900; *Lieut. H. E. Pateshall Thomas* (Herb. Mus. Brit.).

Specimina radice orba usque ad 8·0 cm. alt. Caulis in sicco obtuse alatus et aliquantulo corrugatus, circa 0·2 cm. diam. Folia 1·0–1·3 cm. long., 1·0 cm. lat., margine breviter revoluta, radiatim trinervia, nervus medianus subtus eminens. Calyx 1·0 cm. long., in sicco 0·4 cm. lat.; ala circa 0·5 cm. long., vix 0·2 cm. lat. Corollæ tubus 1·6–1·8 cm. long., deorsum 0·1 cm. sursum 0·2 cm. diam.; limbus fere 2·0 cm. diam.; lobi 0·75 cm. lat. Filamenta circa 0·1 cm., antherarum loculi 0·3 cm., necnon glandula 0·1 cm. long. Ovarium compressum, ambitu lanceolato-oblongum, 0·4 cm. long., medio 0·17 cm. lat.

The leaves of this beautiful little plant are much like those of *Sebæa crassulæfolia* Cham. & Schlecht., only not nearly so markedly amplexicaul. The flowers of the two are, of course, quite different. No *Belmontia* known to me, either by specimens or by description, could possibly be mistaken for the above. I have used the generic name *Parasia*, as it enjoys a few months' priority over *Belmontia*.

Pseudosopubia Delamerei, sp. nov. Herba erecta, in sicco nigricans, scabrida, caule subtetragono folioso striato, foliis oppositis anguste oblongo-linearibus obtusis sessilibus, bracteis foliis similibus junioribus vero brevioribus, pedicellis quam folia brevioribus bracteolis 2 parvis oppositis anguste linearibus onustis, floribus pro genere magnis, calycis evanide nervosi late campanulati in sicco atro-cyanei glabri lobis triangulari-deltoideis acutiusculis quam tubus brevioribus, corollæ extus glabræ tubo sursum maxime amplificato necnon inflato deorsum sensim ac leviter attenuato prope basin tubiformi, labiis duobus latissimis postico emarginato antico breviter trilobo lobis ambitu fere semicircularibus undulatis, antherarum thecis oblongis sursum leviter attenuatis ibique poro dehiscentibus anticis connectivo elongato fultis, capsula ——.

Hab. British East Africa, Dadáro, 3700 feet, 1898; *Lord Delamere* (Herb. Mus. Brit.).

Folia 1·0–1·2 cm. long., 0·1–0·15 cm. lat., intervallis 1·0–2·0 cm. inserta, in sicco deflexa. Bracteæ minores usque ad 0·5 cm. imminutæ. Pedicelli patentes, 0·4–0·6 cm. long. Bracteolæ circa 0·3 cm. long., subapicales. Calyx totus vix 1·0 cm. long.; limbus 1·2 cm. diam.; tubus 0·6 cm. long.; lobi 0·35 cm. long., basi vix 0·4 cm. lat. Corollæ verisimiliter cyaneæ tubus 1·5 cm. long., basi 0·4 cm., sursum paullo ultra 1·0 cm. diam.; labium posticum vix 1·5 cm. long. et 2·0 cm. lat.; labium anticum 2·7 cm. lat., hujus lobi 0·5 cm. long., 1·2 cm. lat. Staminum posticorum filamenta infra medium tubum inserta, 0·8 cm. long.; horum theca 0·7 cm. long.; staminum anticorum filamenta juxta medium tubum inserta, 0·6 cm., theca 1·0 cm., connectivus 0·6 cm., theca abortiva 0·1 cm. et hujus connectivus incurvus 0·4 cm. long.; et filamenta et connectivi crassiusculi. Ovarium late ovoideum, glabrum, 0·3 cm. long.; stylus 3·0 cm. long.

The genus *Pseudosopubia* has recently (Ann. R. Istit. Bot. Roma, Ann. vii. 28) been established by Professor Engler, who includes in it, besides a Somaliland plant collected by Riva (*P. obtusifolia* Engl.), two other species previously referred to *Sopubia*. The present plant resembles *P. Hildebrandtii* Engl. somewhat in its leaves, and, judging from the figure in Bot. Jahrb. xxiii. t. 13, its flowers are most like those of Riva's plant; but it has several points which mark it out as being undoubtedly a distinct species.

Streptocarpus Vandeleuri Bak. fil. & S. Moore, sp. nov. Folio unico? ovato basi cuneato supra pilis elongatis stramineis basi bulbiferis hispidissimo subtus pallidiori et scabridulo necnon secus nervos araneoso margine undulato ibique aculeis curvatis pilis similibus nisi robustioribus obsito, pedunculo piloso in specimine nostro 11-floro, calycis lobis linearibus pilosis, corollæ tubo tubuloso-infundibulari curvato a basi ipsa æquilato limbi admodum obliqui lobis late ovatis obtusis, staminibus inclusis, filamentis sparsissime glandulosis juxta medium tubum affixis, ovario quam corollæ tubus multo breviore una cum stylo dense glanduloso-pubescente, stigmate capitato, capsula ——.

Hab. Greylingstad, Transvaal; *Capt. Vandeleur* (Herb. Mus. Brit.).

Folium circa 19·0 cm. long. et 10·5 cm. lat.; nervi utriusque faciei prominuli, nervi secundarii utrinque circiter 15, leviter curvati. Calycis lobi circa 1·0 cm. long. Corollæ tubus circa 3·5 cm. long.; 0·7–0·9 cm. lat. Flores ex scheda cl. inventoris albi. Filamenta 1·0 cm. long., maxima pro parte dilatata; antheræ vix 0·4 cm. long. Ovarium 1·5 cm. long., 0·2 cm. lat., in stylum 1·2 cm. long. desinens.

This striking plant belongs apparently to the unifoliate section, but we are not certain about this, seeing that our material consists only of an inflorescence and a detached leaf. As will be seen from the measurements, it is one of the largest-flowered species of the genus. Its affinity is with *S. Dunnii* Hook. fil. (Bot. Mag. t. 6903) and *S. Cooperi* C. B. Cl. It differs markedly from its allies in the greater (and uniform throughout) breadth of the corolla tube, and this organ is more distinctly curved than is the case with that of *S. Dunnii*.

Streptocarpus Armitagei Bak. fil. & S. Moore, sp. nov. Folio unico oblongo vel ovato-oblongo obtuso margine irregulariter crenato-lobulato sessili crassiusculo molliter tomentoso præsertim subtus reticulatim venoso supra inter venas bullulato costa crassa subtus villosa pagina inferiore glandulis parvis rubris dense obsita, pedunculis 1?–5-nis dense pubescentibus circa 20-floris, pedicellis pro genere perbrevibus, calycis lobis lanceolatis vel lineari-oblongis pubescentibus necnon glandulis rubris onustis, corolla ei *S. Dunnii* Hook. fil. subsimili sed deorsum minus attenuata levissime curvata extus piloso-pubescente aliquatenus rubro-glandulosa, staminibus inclusis, antheris reniformibus, staminodiis minutissimis, ovario brevi sessili leviter torto cano-tomentoso, stylo quam ovarium circa 5-plo longiore deorsum piloso sursum clavato, capsula ——.

Hab. Barberton, Transvaal; *R. Armitage* (Herb. Mus. Brit.). Summits of the Saddleback Range, Barberton; *Galpin*, No. 704 (Herb. Kew.).

Folium usque ad 18·0 cm. long. et 7·0 cm. lat.; costæ secundariæ utrinque circiter 18. Pedunculi circa 10·0 cm. alt. Pedicelli dense pubescentes, 0·5 cm. long. Calycis lobi 1·0 cm. long.

Corollæ tubus 3·0 cm. long., 0·8 cm. lat. Flores rosei. Antheræ 0·3 cm. lat. Ovarium 0·5 cm. et stylus 2·7 cm. long.

A plant showing much affinity to *S. Dunnii*, and, indeed, Mr. Galpin's specimen has received that name at Kew. But in our opinion there is too much difference between it and *S. Dunnii* to justify this course. The chief differences lie in the indumentum, the short pedicels, broader calyx lobes, and deeper coloured corolla-tube with much less of that narrowing in the lower half characteristic of the species described by Sir Joseph Hooker.

The length of the peduncles and the dimensions of the leaf have been taken from the Kew specimen, Mr. Armitage's not furnishing these particulars satisfactorily.

Geniosporum (§ TEMNOCALYX, sectio nova) **fissum**, sp. nov. Herba, caule minute pubescente demum fere glabro, foliis parvis sessilibus cuneato-oblongis obtusis margine medio 1–2-dentatis ceterum integerrimis mox minutissime puberulis, inflorescentia parum ramosa folia longe excedente, bracteis ovatis obtusis dense ac minute pubescentibus, deciduis, pedicellis calycem excedentibus, calycis pubescentis campanulati *antice funditus fissi* lobis subæqualibus (postico vero paullo majore) lanceolatis acutis tubo longioribus, corollæ tubo calycem paullo excedente anguste tubuloso-campanulato limbi labio postico abbreviato 4-fido labio antico quam posticus paullo longiore integro plano, staminibus breviter exsertis.

Hab. British East Africa, Dadáro, 3700 feet, 1898; *Lord Delamere* (Herb. Mus. Brit.).

Folia 1·5 cm. long., medio 0·6 cm. lat., in sicco subgrisea. Inflorescentia usque ad 11·0 cm. long.; ramuli floriferi juveniles bracteis arcte imbricatis onusti; verticillastri pluriflori, intervallis 0·5–1·0 cm. long. inserti. Bracteæ 0·25 cm. long., vix totidem lat. Pedicelli circa 0·3 cm. long., pubescentes. Calyx totus 0·2 cm. long.; tubus 0·05 cm. et lobi 0·15 cm. long. Corollæ tubus 2·5 cm. long.; labium anticum ovatum, 0·2 cm. long.; labium posticum paullo ultra 0·1 cm. long. Antheræ 0·03 cm. diam. Nuculæ ——.

The peculiarity of the section here proposed is that the calyx is slit throughout along the line of junction of its two anticous lobes. I have in vain sought other characters which might justify one in regarding this plant as the representative of a new genus.

Orthosiphon (§ VIRGATI) **gofensis**, sp. nov. Verisimiliter fruticulus caule erecto tenui sursum ramoso, ramis gracilibus crispule pubescentibus, foliis parvis sessilibus oblanceolatis obtusis crenato-serrulatis supra puberulis subtus pubescentibus, verticillastris pauci-(2–6-)floris in racemum folia superantibus dispositis, bracteis deciduis foliis similibus sed quam ea multo brevioribus, pedicellis floriferis calycibus paullo brevioribus, calycis florescentis cylindrici pubescentis lobo postico rotundato obtusissimo lobis lateralibus oblongis obtusis quam posticus paullulum brevioribus lobis anticis linearibus lateralibus subæquilongis, calycis fructescentis angusti puberuli lobo postico erecto vel fere erecto ore calvo, corollæ minimæ tubo sat lato calycem paullo superante lobis brevibus, staminibus inclusis, stigmate clavato-capitato leviter emarginato.

Hab. British East Africa, Gof, 1898; *Lord Delamere* (Herb. Mus. Brit.).

Specimen unicum meos ante oculos spithameum. Caulis 0·2 cm. diam., glaber. Folia 1·0–2·0 cm. long., 0·3–0·4 cm. lat., subtus decoloria; petioli 0·15 cm. long. Bracteæ 0·3 cm. long. Pedicelli floriferi 0·2 cm. long., pubescentes. Calyx florescens 0·25 cm. long.; fructescens nervis paullo eminentibus percursus, modo 0·4 cm. long., lobus posticus 0·15 cm. long., lobi reliqui (quam posticus paullulum breviores) inter se subæquales, antici vero angustiores et majus acuminati. Corollæ tubus 0·35 cm. long.; limbi microscopice pilosuli labium anticum circa 0·16 cm. long., hujus lobus intermedius obovatus quam laterales ovati manifeste longior. Nuculæ subcylindricæ, 0·065 cm. long.

As respects habit and foliage almost an exact counterpart of *O. parvifolius* Vatke. This habit, together with the exceedingly small and narrow fruiting calyces with naked throat, the corolla tube exceeding the calyx and the included stamens and style are the main points about the species.

Plectranthus (§ GERMANIA) **keniensis**, sp. nov. Herba formosa, elata, caule robusto fere omnino glabro crebro ramoso, ramulis foliosis pilosis, foliis sat magnis longipetiolatis late ovatis acutis basi cordatis rarius truncatis grosse dupliceque crenatis tenuiter membranaceis mox fere omnino glabris, panicula elongata pauciramosa pilosa, verticillastris sæpissime 5–6-floris, bracteis late ovatis obtusis quam pedicelli brevioribus, pedicellis calyces excedentibus, calycis florescentis campanulati pilosi tubo limbum excedente lobo postico late ovato obtusissimo lobis reliquis triangularibus acuminatis, calycis fructescentis lobo postico quam reliqui breviore lobis anticis quam laterales paullo brevioribus, corollæ magnæ tubo calycem excedente ultra calycem leviter curvato et inde maxime ampliato labio postico amplo trifido quam anticus oblongo-ovatus paullo breviore, staminibus inclusis.

Hab. Mount Kenia, Aug. 14th, 1899; *H. J. Mackinder* (Herb. Mus. Brit.).

Herba saltem ultra semimetralis. Caulis circa 0·4 cm. diam., in longitudinem alte sulcata. Foliorum lamina 5·0–7·5 cm. long., et totidem lat. (exstant vero folia juvenilia usque ad 3·5 cm. long. imminuta), in sicco læte viridis; petioli usque ad 7·0 cm. long., pilosi. Panicula saltem 35·0 cm. long. Bracteæ 0·25 cm. long., pilosæ. Pedicelli 0·6 cm. long. Calyx florescens 0·4 cm. long.; lobus posticus vix 0·2 cm. long. Calyx fructescens 0·7 cm. long.; hujus lobi antici 0·3 cm. long., leviter incurvi; lobus posticus 0·23 cm. long. Corollæ (teste cl. inventori) saturate violaceæ tubus usque ad 0·45 cm. supra basin cylindricus, pars amplificata 0·7 cm. long.; labium posticum 0·8 cm., labium anticum 1·0 cm. long. Filamenta 0·5 cm. long. Antheræ 0·1 cm. diam. Nuculæ compressæ, ovoideæ, glabræ, 0·15 cm. long.

To be placed near *P. flaccidus* Gürke and its allies. The habit, the large cordate leaves on long petioles, the large flowers with very broad corolla lobes and upper part of the tube are among the distinguishing features of this handsome plant.

[Obs.—To "*Plectranthus floribundus* N. E. Br." (Journ. Bot. 1900, p. 464) should be added "var. *longipes* N. E. Br." The type form, which is extratropical, does not occur among Dr. Rand's plants.]

Coleus (§ Solenostemonoides) **somalensis**, sp. nov. Herba caule erecto ramoso robusto intervallis brevibus foliato strigoso-pubescente, foliis longipetiolatis ovatis obtusis basi cuneatis margine crenulatis crassiusculis pilis paucis brevissimis strigosis appressis utrinque obsitis, petiolis anguste alatis, verticillastris 2–5-floris in racemum simplicem folia multoties excedentem dispositis, pedicellis calycem excedentibus una cum racemo glanduloso-pubescentibus, bracteis minimis ovato-lanceolatis valde deciduis, calycis florescentis glanduloso-pubescentis a corollæ tubo paullo superati lobo postico jam patente late ovato acuto lobis lateralibus tubo æquilongis et revera lobum posticum paullulum excedentibus lanceolatis acutis lobis anticis linearibus acutis quam laterales brevioribus, calyce fructescenti puberulo 0·6 cm. long., corollæ labio postico late ovato obtusissimo quam anticum oblongum multo breviore.

Hab. Gan Liban, Somaliland, March, 1899; *Dr. Donaldson Smith* (Herb. Mus. Brit.).

Caulis juxta solem 0·3–0·4 cm. diam., radice elongato creberrime fibrillifero fultus. Foliorum lamina modice 3·0 cm. long., 1·6–2·0 cm. lat., subtus glandulis parvis dense obsita; petioli 1·3 cm. long., pubescentes. Bracteæ 0·13 cm. long., pubescentes. Pedicelli 0·5–0·6 cm. long. Calyx florescens 0·3 cm. long.; lobus posticus 0·17 cm. et lobi laterales 0·22 cm. long. Calyx fructescens 0 6 cm. long.; lobus posticus plane decurrens circa 0·3 cm. long. et lat.; lobi reliqui postico æquilongi, acuminati. Corollæ tubus 0·4 cm. long., 0·2 cm. lat., paullo supra basin subito antice deflexus; labium posticum 0·35 cm. long.; anticum fere 1·0 cm. long. Staminum vagina 0·45 cm. long.; filamenta libera 0·6 cm. long. Antheræ vix 0·1 cm. diam. Nuculæ ambitu subcirculares, politæ, 0·1 cm. diam.

Apparently nearest *C. vestitus* Baker; differing from it, *inter alia*, in clothing of branches and leaves, pedicels longer than the calyx, corolla tube longer than the calyx, &c.

Neomüllera damarensis, sp. nov. Herba elata, erecta, crebro ramosa, caule ramulisque minute glanduloso-pubescentibus, foliis longipetiolatis e basi lata ovatis grosse crenato-serratis puberulis tenuiter membranaceis, paniculis elongatis permultifloris, floribus solitariis in cymas racemosas ramosas sæpe unilateraliter dispositis, bracteis obsoletis, pedicellis calyce brevioribus, calycis florescentis campanulati pubescentis usque ad medium lobati lobis subæqualibus lanceolato-ovatis acutis lobo postico concavo lobis reliquis planis, calycis fructescentis oblongi parum inflati basi circumscissi lobis erectis, corollæ tubo calycem longe excedente dimidio inferiore cylindrico angusto juxta medium subito incurvo indeque amplificato, labio postico parvo bilobo antico majori concavo, filamentis paullo supra insertionem connatis, genitalibus labio antico inclusis.

Hab. Damaraland, 1879; *T. G. Een* (Herb. Mus. Brit.).

Folia usque ad 2·5 cm. long., et 2·2 cm. lat., glandulis minimis abundanter instructa; petioli fere usque ad 2·0 cm. long., minute pubescentes. Paniculus 30·0 cm. long., hujus ramuli modici 3·0–4·0 cm. long. Pedicelli 0·15 cm. long. Calyx florescens in toto 0·3 cm. long. Calyx fructescens 0·5–0·6 cm. long., 0·2 cm. lat., nervis parum eminentibus percursus. Corollæ tubi pars cylindrica 0·4 cm. long., 0·07 cm. lat.; pars amplificata vix 0·5 cm. long., sub limbo 0·4 cm. lat.; labium posticum rotundatum, 0·3 cm. lat.; labium anticum 0·7 cm. long. Filamentorum vagina 0·2 cm long.; filamenta libera 0·45 cm. long.; antheræ 0·08 cm. diam. Nuculæ ovoideæ, politæ, 0·1 cm. lat.

Differs from *N. Welwitschii* Briquet, the only species hitherto, in leaf, densely paniculate inflorescence, &c. The equality in size of the anticous calyx lobe to its fellows is a small character in respect of which the generic diagnosis requires slight modification; the lobe is, however, concave, and in this it agrees with *N. Welwitschii.*

Explanation of Plate 424.

The drawings of the plants natural size; the analyses more or less magnified.

A. *Leurocline lithospermoides.* 1. Corolla opened out. 2. Calyx opened to show the small posticous lobe, bilobed stigma, &c. 3. View of fruit, the nutlets slightly disparted to show the flat gynobase. B. *Omania arabica.* 4. A bud showing the upper lip (u) inside in æstivation. 5. Calyx opened to show its zygomorphic character. 6. Corolla cut open. 7. Ovary in transverse section.

PLANTS OF NORTH SCOTLAND, 1900.

By Rev. E. S. Marshall, M.A., F.L.S.

I spent nearly three months with my family in the far north of Britain last summer, making my head-quarters at Tongue, and reaching points as far distant as Durness westward and Wick eastward. On July 10th my wife and I met our old friend Mr. W. A. Shoolbred in Thurso for an expedition to Ben Griam More, near Forsinard, which had been justly recommended to us by Mr. W. Lindsay as a good hill for its comparatively small height; we then crossed to Orkney for five days' collecting, and our companion returned with us for a few excursions near Tongue. On August 14th we made a partial ascent of Ben Wyvis with Mr. F. C. Crawford, of Edinburgh, having only time to hastily explore its smaller south-eastern corrie. The vice-counties visited are—106 East Ross, 107 East Sutherland, 108 West Sutherland, 109 Caithness, and 111 Orkney. As usual, I am greatly indebted to Mr. Arthur Bennett for help in working out critical forms; also to Messrs. H. & J. Groves, Hanbury (*Hieracium*), Kükenthal (*Carex*), Linton and Townsend (*Euphrasia*). The sign * denotes an unpublished vice-comital record; † an apparently new British plant.

Thalictrum alpinum L. 107.* Ben Griam More. 108. Remarkably plentiful along the coast about Tongue, descending almost to sea-level.

Fumaria pallidiflora Jord. 111.* Abundant in cornfields near the head of Loch Stenness, between Stromness and Sandwick; also east of Loch Kirbister. — *F. Boræi* Jord. 108.* Cultivated land at Dun Varrich, Tongue. 111. Oatfield near Scapa Bay, plentiful.—*F. muralis* Sonder. 111.* Cornfields above Loch Stenness, with *F. pallidiflora;* in considerable quantity, but small and apparently not quite typical.

Barbarea arcuata Reichb. 109.* Frequent, and I believe native, by the Wick River, two to five miles above the town. Confirmed by Mr. Bennett, who considers it practically identical with Thuringian specimens collected by Haussknecht. *B. vulgaris* R. Br. grows just above the bridge at Thurso, but has every appearance of being an introduced plant.

Arabis petræa Lam. var. *hispida* DC. 108. Very scarce on the north-west cliffs of Ben Hope, at about 2000 ft. I failed to find *Draba rupestris;* perhaps a small state of *D. incana* may have been mistaken for it there, as was the case in its reputed Irish station.

Cardamine hirsuta L. 107. At 1500 ft. on Ben Griam More—an unusual height for it to attain, according to my experience.

Erophila præcox DC. (*E. brachycarpa* Jord. !). 109.* Frequent at Dunnet Links, and on the grassy cliffs hard by; this greatly extends its known range in Britain. — *E. inflata* Hooker fil. ? 108.* Pebbly drive at Loch Loyal Lodge, half-way between Tongue and Altnaharra. Pods decidedly turgid; very like what I have under this name from Glen Shee, though (owing to the altered conditions) much more robust.

Cochlearia groenlandica L. 108. Strand at Hielam Ferry; sandy coast, Skerray. 111.* Exposed turfy headlands, Black Craig, Mainland.

Viola silvestris Reichb. 109.* Bank near Bilbster Station.—*V. arvensis* × *tricolor*. 111. Cornfields between Stromness and Sandwick.

Silene acaulis L. 106.* Ben Wyvis at 3000 ft., scarce.

Lychnis alba × *dioica*. 108.† Near Tongue Ferry, with the parents; confirmed by Mr. Bennett, who gives the following synonyms:—*Melandryum dubium* Hampe, *M. intermedium* Schur, *M. album* × *rubrum* Gaertner. Probably "new" in name only; for, in a recent paper on the subject of natural hybrids, Mr. R. A. Rolfe suggested that it was likely to prove not uncommon. My specimens were just intermediate in character, and appeared to be sterile, but they were hardly advanced enough to make sure of this.

Cerastium tetrandrum Curt. 108. A remarkable form (or state) grows in fissures of the limestone cliffs filled with blown sand, three or four miles east of Durness; it is erect, with the inflorescence mostly terminal, and approaches the *C. alsinoides* Pers. of Southern Europe. — *C. semidecandrum* L. 108.* Tongue, apparently very scarce and local.

Sagina maritima Don, var. *debilis* (Jord.). 108. Scullomie Harbour.

Lepigonum rubrum Fr. 107. Plentiful on railway-ballast south of Forsinard. — *L. marinum* Wahl. 108.* Kyle of Tongue, local.

111. Hamna Voe, Stromness.—At the north-east end of Tongue Island we found abundance of a plant having the general appearance of *L. marinum*, though of a brighter green than usual, and without the broad scarious wing to the seeds. A single specimen was also seen on the beach at Linksness, Hoy (111). As this is apparently undescribed, I propose for it the name of var. *apterum* (or *aptera*, if *Spergularia* is eventually accepted as the generic name).

Radiola linoides Roth. 111. Loch of Skaill, near Sandwick.

Lupinus nootkatensis Donn. 111. Heathy waste between Stromness and Sandwick; several patches, in one instance covering several acres. Alien (or "deserter," as a local botanist aptly called it).

Trifolium medium L. 106. Achterneed, near Strathpeffer; rare in the north Highlands. Close by grew *Rubus Rogersii* Linton.

Dryas octopetala L. 107.* Ben Griam More.

Alchemilla vulgaris L. var. *alpestris* (Schmidt). 109. Wick River; Thurso River, together with the type (*A. pratensis* Schmidt.). 111. Near Stromness.

Rosa mollis × *pimpinellifolia*. 108. Low cliff at Hielam Ferry.

Pyrus Aucuparia L. 111. On the Dwarfie Hamars, Hoy, this was found in flower; the bushes varied in height from 1½ to 5 ft.

Saxifraga oppositifolia L. 107.* Ben Griam More. — *S. tridactylites* L. 109. Dunnet Links.

Hippuris vulgaris L. 107. Near Forsinard. 108. Near Thurso. 111. Peat-bog west of Stromness. Uncommon, I think, so far north.

Callitriche hamulata Kuetz. 106. Small tarn in the south-eastern corrie of Ben Wyvis.

Epilobium angustifolium L. 108. Ben Hope, at 2000 ft.; very scarce.

Myrrhis odorata Scop. 108. In several places about Tongue village; no doubt a relic of cultivation, like *Saxifraga umbrosa* L.

Scandix Pecten-Veneris L. 111. Cornfields between Stromness and Sandwick; only a few plants were seen.

Ligusticum scoticum L. 111. Coast between Waulkmill Bay and Scapa Bay, in a single station.

Cornus suecica L. 107. Ben Griam More; locally plentiful at 1500 ft. on the east side.

Valeriana sambucifolia Willd. 111. East side of Kirbister Loch, sparingly.

Saussurea alpina DC. 107. Ben Griam More; more abundant than I ever saw it elsewhere.

Centaurea Scabiosa L. In Journ. Bot. 1898, p. 170, Mr. Shoolbred and I mentioned and described a doubtful form which we had found at Coalbackie and Melness, on the east and west coasts of Tongue Bay. Specimens were forwarded to the Botanical Exchange Club, and commented on by Herr Freyn, of Prague, in the Report for 1897, p. 552, as being "a very remarkable plant, which has not hitherto come under my notice. . . . In any case, this *Centaurea* is highly interesting." It has kept quite distinct in cultivation, and reproduced itself from seed. Much as the species varies in foliage (especially in that very neighbourhood), this stands out prominently; though I have found some intermediates which appear to be "mongrels." Last year I was able to study the wild plant afresh, and satisfied myself that it was a good variety, if not a subspecies. The root-leaves are rather numerous, quite entire, occasionally a foot long (including the stalk) in luxuriant specimens, oblanceolate, narrowed into a slender petiole not much shorter than the blade. Lower and upper stem-leaves entire, the middle ones often with one or two pairs of stipuliform pinnæ at their base, entire or obscurely crenate-dentate. Mr. James Groves has kindly pointed out that there is a var. *integrifolia* Vukot, *Novæ Form. Querc.* (1880) *S. A.* 40, quoted in Beck's Flora of Lower Austria as having "all the leaves undivided." This may perhaps be the same thing; but a Tyrolese specimen with undivided leaves in Herb. Brit. Mus. differs in habit from the Sutherlandshire plant; and Herr Freyn's inability to recognize this induces me to name it provisionally as var. *succisæfolia*, from the close resemblance of its leaves to those of a very luxuriant *Scabiosa Succisa* which occurs on the cliffs at Coalbackie.

Hieracium globosum Backh. 106. Ben Wyvis. — *H. Backhousei* F. J. Hanb. 106.* Ben Wyvis.—*H. anglicum* Fr. 111. Frequent along the South Burn, Hoy. — *H. argenteum* Fr. var. *septentrionale* F. J. Hanb. 108. Abundant on the coast about Scullomie and Skerray; inland by the Vagastie Burn, Altnaharra. A single specimen of the type was found at Coalbackie.—*H. nitidum* Backh. 107.* East side of Ben Griam More at 1500 ft. 108. Scarce on the northern cliffs of Ben Hope. — *H. Sommerfeltii* Lindeb. 108. Near sea-level on cliffs below Castell Varrich, Kyle of Tongue.—*H. stenolepis* Lindeb. 108. Low dolomite cliffs at Hielam.—*H. murorum* L. var. *micracladium* Dahlst. 108. Rocks near Farr Church, Betty Hill. — Var. *ciliatum* Almq. 108. Eastern base of Ben Loyal; also on the north-western cliffs of Ben Hope.—*H. orarium* Lindeb. 108. Sandy cliff, Coalbackie; only one plant seen.—Var. *fulvum* F. J. Hanb. 109. Thurso River. 111. On the cliffs of Waulkmill Bay occurs a form which I cannot separate from the foregoing, of which it has the orange-yellow flowers, dark styles, and pilose-tipped ligules. Mr. Hanbury objects that the leaves are too entire, and the involucral clothing not shaggy enough; but the specimens varied a good deal in these respects. It closely resembles the Melness sandhill hawkweed which Messrs. Linton have recently issued as var. *erythræum*, but which I also incline to consider as only a state of var. *fulvum*, due to situation; last summer, which was cold and wet, this was very like the Thurso plant. — *H. duriceps* F. J. Hanb. var. *cravoniense* F. J. Hanb. 108.* Ardskinid Point, Tongue Bay, very rare; exactly matching authentic Yorkshire specimens.—*H. angustatum* Lindeb. 108. Rather plentiful on the north-western cliffs of Ben Hope.—*H. auratum* Fr. 111. By a streamlet between Kirbister and Waulkmill Bay. — *H. umbellatum* L. var. *pauciflorum* Hartm. 108. Grassy cliffs, Skerray; locally abundant.

Taraxacum palustre DC. var. *udum* (Jord.). 108. Tongue, abundant. This is, I suspect, the same thing as *T. officinale* var. *alpinum* Koch, lately recorded by Mr. Druce from Lochnagar, &c.; at least, the description fits it well enough, and what we have been calling *T. udum* Jord. is frequent on the Grampians.

Sonchus arvensis L. var. *glabrescens* Hall. (*lævipes* Koch). 108.* Oatfields near Coalbackie, with the type.

Arctostaphylos alpina Spreng. 106. West side of Ben Wyvis. 107.* Abundant on Ben Griam More, descending to 1000 ft. It was in good flower upon the lower slopes of Ben Hope on May 25th.

Azalea procumbens L. 107. Summit of Ben Griam More.

Pyrola rotundifolia L. 108.* Ben Hope, at 2000 ft., with *P. minor* L.; very rare.

Primula acaulis × *veris*. 108. Near Betty Hill. The links at Reay (109) were ablaze with cowslips at the end of May.

Symphytum tuberosum L. 109.* High bank of the Wick River, between three and four miles above the town; very scarce, but apparently a true native, and remote from houses.

Veronica agrestis L. 108. A garden weed at Loch Loyal Lodge. 111. Cornfield near Stromness—the blue-flowered form. — *V. arvensis* L. var. *eximia* Towns. 109.* Grassy cliffs near Dunnet Sands.

Euphrasia borealis Towns. 111. Stenness; Waulkmill Bay.—*E. brevipila* Burnat & Gremli. 111. Common in Mainland, Orkney. —*E. brevipila* × *curta*. 111.† Stenness.—*E. scottica* Wettst. 111. About Hobbister and Kirbister.—*E. curta* Fr. 106.* Achterneed. 107.* Forsinard. 108. Tongue; Scullomie; Skerray. A luxuriant form, 9–12 in. high, occurs near Melness. 111.* Common in Mainland and Hoy—both type and var. *glabrescens* Wettst.—*E. curta* × *foulaensis*, n. hybr. 108.† Scullomie.—*E. curta* × *latifolia*, n. hybr. 108.† Scullomie. — *E. curta* × *scottica*, n. hybr. 108.† Among heather, east of Scullomie. — *E. foulaensis* Towns. 106.* Ben Wyvis, at nearly 3000 ft. This was referred by Mr. Townsend to *E. latifolia;* but it lacks the abundant white pubescence and whitish flowers of that closely-allied species, and appears to me quite identical with the Ben Loyal plant which he accepts as being true *foulaensis*. I have only met with *E. latifolia* on the coast, at no great altitude. 111.* Black Craig, &c., in short turf.—*E. latifolia* Pursh. 108. Very fine and abundant on grassy slopes at Scullomie and Skerray. 111.* Black Craig.

Rhinanthus Crista-galli L. 111. A small narrow-leaved form growing sparingly on the south side of Loch Stenness; Mr. C. E. Salmon collected it at Inchnadamph (108) a year or two back.

Melampyrum pratense L. var. *montanum* Johnst. 107. Lower slopes of Ben Griam More.

Thymus Serpyllum Fr. var. *prostratum* Hornem. 111. Between Stromness and Sandwick; particularly plentiful near the Loch of Skaill.

Ajuga pyramidalis L. 107. Ben Griam More; scarce and very local at about 1500 ft.

Salsola Kali L. 108.* Melness Sands, scarce.

Polygonum viviparum L. 107.* Ben Griam More.

Betula nana L. 106. West side of Ben Wyvis. 108. Locally plentiful at the north-east base of Ben Loyal, descending below 800 ft.; some bushes were about a yard high, and fruited freely.—

B. alpestris Fr. 108.† I had long been on the watch for hybrids between *B. nana* and *B. pubescens*; therefore, having found the two growing together in good quantity below Ben Loyal, I made a careful search, which was at length rewarded by the discovery of a plant bearing evident traces of this parentage; it occurred by a streamlet at just 800 ft. above sea-level. On comparing this with the account of *B. alpestris* in Summa Veg. Scand. p. 212, I found it to correspond in all respects, except that the leaves were sparsely hairy; oddly enough, the specimen in Herb. Brit. Mus. of Fries, Herb. Normale (which might have well been cut from the same bush), shows the same divergence. The original description is as follows:—"Foliis subrotundis obtuse serratis obtusis glaberrimis, *subtus lævibus*, *amentis* fructiferis *pedunculatis erectis*, pedunculo amentum æquante, lobis squamarum digitato-trifidis, *laciniis distantibus porrectis subæqualibus*, nucibus obovatis, ala cinctis latitudinem nucis æquante. B. nana v. intermedia. *Hartm. Vet. Ac. Handl.* 1818, *p.* 148. B. alba v. interm. *Wahl. Suec.* p. 624. B. humilis *Hartm. Scand.* 2, *p.* 228, nec Schrank, Koch. . . . Valde analoga cum *B. intermedia* Thom.!, sed hæc ad *B. albam* accedit, ut alpestris ad *B. glutinosam*. B. alpestris semper . . . fruticosa est, vix orgyalis, foliis fere *B. nanæ* . . ." Regel apparently regarded *B. intermedia* Thomas as *nana* × *verrucosa* ("alba"); but Focke makes them both to be *nana* × *pubescens*. In 1886 Mr. F. J. Hanbury and I found a good-sized tree in Glen Callater, South Aberdeen, which was eventually agreed to by Mr. Bennett as the plant of Thomas, after comparison with an authentic specimen at Kew; it certainly agrees well enough with the figures in *Fl. Danica* and in *Reichenbach*. In 1887 I came across a second example, about 8 or 9 ft. high, near the ferry at Cashil Dhu, Loch Hope, which was slightly nearer to *B. alpestris*, but hardly separable from the Aberdeenshire plant. As far as Britain is concerned, I think that we may probably consider *B. alpestris* as *B. nana* ♀ × *pubescens* ♂, and *B. intermedia* as *B. nana* ♂ × *pubescens* ♀; the first approaching more closely to *nana*, the second to *pubescens*. *B. humilis* Schrank is a true species, and quite distinct.

Salix cinerea × *repens*. 108. Ardskinid, Tongue Bay, in two forms; one just intermediate, the other on the *repens* side. With them grew another bush which appears to be (*aurita* × *repens*) × *cinerea*, accompanied by *S. aurita* × *repens* (*ambigua* Ehrh.).—*S. phylicifolia* L. 111. Linkness, Hoy; Loch Kirbister, &c., Mainland. — *S. Lapponum* L. 106.* A few bushes were noticed on one crag in the south-eastern corrie of Ben Wyvis. — *S. Myrsinites* L. 107.* Sparingly on Ben Griam More; both the type and well-marked var. *procumbens* (Forbes).

Juniperus communis L. var. *intermedia* Nyman. 108.* By the cave at Ardskinid. "Yes; this looks quite like the Austrian Tyrol plant."—Ar. Bennett *in litt.*

Malaxis paludosa Sw. 108. Bog, a little east of Scullomie.

Epipactis atrorubens Schultz. 108. Near the cave, Ardskinid; extremely local, but fifty or sixty specimens were seen. Close by we secured a single plant of *E. atrorubens* × *latifolia*,† which was a good intermediate in all respects (*latifolia* is very scarce in this station). M. Schulze only mentions the hybrid as having been found once in Russia and once near Jena, in Germany; but Focke (*Pflanzenmischlinge*, p. 380) says that it "occurs not uncommonly with the parents, and has been represented as a transition-form, which was supposed to prove the specific identity of the two species." In Britain they very seldom grow together.

Orchis mascula L. 108. Plentiful on the limestone near Durness, at Ardskinid, and about Betty Hill; the leaves were always unspotted.—*O. incarnata* L. 107.* About Forsinard. 111. Abundant in a swamp at Orgill, Hoy, with very pale flowers; also seen in two or three spots on Mainland. — *O. latifolia* L. var. *brevifolia* Reichb. 109.* Swampy pasture about a mile north of Bilbster Station; just like the plant of South-east Ireland, the leaves being faintly ring-spotted, and the flowers dingy purple. — *O. latifolia* × *maculata ?* 108. Scullomie. 109. Near Bilbster. 111. Near Stromness. I believe this identification to be correct, but am not quite free from doubt.—*O. maculata* L. subsp. *O. ericetorum* Linton (*Fl. Bournemouth*, p. 208). Evidently very common throughout North Scotland; Mr. Linton has confirmed the name in all the cases submitted to him. We observed it as follows:—107. Forsinard. 108. Tongue, Scullomie, Skerray, Betty Hill. 109. Wick, Bilbster. 111. Hoy and Mainland, *passim*.

Habenaria conopsea Benth. 108. A form with flesh-coloured blossoms grows about Tongue; this is probably the *Gymnadenia conopsea β pallidiflora* Lange, *Haandb. i den danske Flora.* — *H. conopsea* × *Orchis maculata* (subsp. *ericetorum*). 108.* Coast-slopes near Scullomie; discovered by Mr. Shoolbred. We only obtained two specimens; roughly speaking, they were like *H. conopsea* with a spotted broader lip, rather shortened spur, and paler flowers. I have seen a Kentish specimen in Mr. Hanbury's collection, which is very similar, though larger.—*H. albida* × *conopsea*. 108.* Two specimens in a hilly pasture at Tongue; one at Scullomie. In this neighbourhood the parents are both abundant, and grow together in many places; but I had great difficulty in finding the hybrids between them. Probably they are fertilized, as a rule, by different insects, as one would expect from the great difference in the length of the spur. One specimen was just intermediate, another towards *albida*; the third, though also an evident hybrid, had the spur hardly at all shorter than in *conopsea*. I saw one of the West Inverness plants so named by Mr. Rolfe in a fresh state, two or three years ago, which closely resembled these.

Iris Pseudacorus L. 111. The prevailing form is var. *acoriformis* (Boreau); we only found the type at the north-west end of Loch Stenness.

Juncus supinus Moench, var. *Kochii* Bab. 108. Plentiful about Loch Deerie, near Tongue.

Luzula erecta Desv. 106. At 3000 ft. on Ben Wyvis occurs a form which is probably var. *sudetica* of Lond. Cat. ed, 9 (*L. nigricans* DC., *L. multiflora γ nigricans* Koch); it scarcely differs from plants which I have gathered near the Eggisch-horn, Upper Valais.

Sparganium simplex Huds. 111. Swampy ground near the South Burn, Hoy, a mile or more from Rackwick.—*S. affine* Schnizl. was flowering in a pool near Sandy Loch, towards Orgill.

Potamogeton heterophyllus Schreb. 111. A narrow-leaved plant in the pool just mentioned; Mr. Bennett remarked that it had the look of *P. gracilis* Wolfg. (non Fr.), a *heterophyllus*-form found in the lakes of Finland, &c. — *P. heterophyllus* × *perfoliatus* (*P. nitens* Weber). 111. Mill-pond between Stromness and Sandwick (form *P. curvifolius* Hartm.). Pool at the north-west end of Loch Kirbister (form *P. intermedius* Tis.). With the parents.

Zostera marina L. var. *angustifolia* Hornem. 108.* Kyle of Tongue, very local; Mr. Bennett points out that Hornemann, not Fries, was the author of the varietal name.

Eleocharis uniglumis Reichb. 111. Plentiful on the south side of Loch Stenness. *E. multicaulis* Sm. was noticed not far from Rackwick, Hoy.

Eriophorum latifolium Hoppe. 108. Below Ben Loyal, on the west side.

Carex pauciflora Lightf. 107. Plentiful at 500 ft. on the moorland between the railway and Ben Griam More. 108. West of Ben Loyal, between 300 and 400 ft. I never saw it below 1000 ft. elsewhere. — *C. incurva* Lightf. var. *erecta* O. F. Lang (= *C. juncifolia* All.). 108.* Damp micaceous ground at Scullomie Harbour. Stems erect or ascending, 2–12 in. long; leaves much longer than usual, those from the root occasionally attaining a height of 6 in. Mr. Bennett has it from Orkney; I have gathered a very similar form near the Matterhorn, above Zermatt.—*C. chordorrhiza* L. (in Ehrhart, *Phytophylacion*). 108. This is abundant in a swamp on the north side of the Mudal Water, Altnaharra, as well as on the south side. — *C. paniculata* L. 111. A few plants in a swamp east of Loch Kirbister.—*C. curta* Good. 108. Dried-up lake near Loch Modsarie, between Tongue and Skerray; also in the marshes near Loch Naver, Altnaharra—scarce in both stations. It seems to be rare in the north. — *C. aquatilis* Wahl. 109. The prevailing form of the Wick River is ordinary low-ground *aquatilis* (*elatior* Bab.); but a plant occurs not uncommonly with decidedly acuminate or cuspidate glumes, half as long again as usual. — *C. aquatilis* × *Goodenowii*. 109.† Wick River, in two forms; one (a very beautiful plant) rather approaching *Goodenowii* in its inflorescence when dry, though looking exactly intermediate in a living state; the other, of which I seem to have gathered only one example, looks just between the two. — *C. aquatilis* × *salina*, var. *kattegatensis* (× *C. Grantii* Ar. Benn.). 109. Three or four forms were collected; one, which approaches *aquatilis*, is probably the *C. aquatilis* var. *cuspidata* Laestad., now considered to be a hybrid. The variableness of *C. salina* hereabouts is very great. — *C. Goodenowii* J. Gay. 108. A curious form (or monstrosity) was found in good quantity by Mr. Shoolbred at the south end of Loch Deerie; it has small globose or ovoid female spikelets, the solitary male spikelet bearing several apparently perfect fruits at its apex. — *C. pilulifera* L. var. *longebracteata* Lange (*Leesii* Ridley). 106. Ben Wyvis. — *C. panicea* L.

var. *tumidula* Laestad. 108. Plentiful and luxuriant in the marshes near Loch Naver, Altnaharra. — *C. capillaris* L. 107. Near the summit of Ben Griam More. 108. Limestone hills east of Durness; on the dolomite near Hielam Ferry, at sea-level; Coalbackie, and other places on the coast near Tongue. — *C. binervis* × *rigida*, n. hybr. 106. South-east corrie of Ben Wyvis, with the parents, at 2700 ft. or more; a good-sized patch, but only two spikes were present. Root- and stem-characters almost entirely *rigida;* leaves much longer, but similar in texture. Inflorescence half-way between the two, quite barren; the lowest spikelet in my specimen has a peduncle 1 in. long, and is placed 2 in. below the others, which are contiguous, as in *rigida.* A few minutes before, Mr. Crawford had discovered (at nearly 3000 ft.) an extraordinary sedge, of which I have no specimen, which resembled *C. rigida* in habit, with the inflorescence of *C. curta;* we did not observe the latter species, but could feel no doubt about its being the offspring of these two. Roots were sent to the Royal Botanic Garden, Edinburgh; so that further light on both plants may be expected. — *C. Hornschuchiana* Hoppe × *Oederi* var. *oedocarpa* And. (*C. sterilis* Syme; *? C. fulva* Good.). 108. Marshes, Altnaharra. 111. Stenness, Mainland. All my gatherings of this group were accepted by Herr Kükenthal as correct.—*C. flava* L. var. *lepidocarpa* (Tausch.). Frequent in the north, where I have never found typical *flava.* 108. About Tongue, in several stations; Betty Hill. 109. Swampy ground near the Wick River. 111. Linksness, and other places in the north part of Hoy; common. In the four specified localities it grew with *C. Hornschuchiana*, and produced perfectly barren hybrids. *C. Hornschuchiana* × *lepidocarpa* is mentioned by Dr. Focke in *Beobachtungen an Mischlingspflanzen* (1892) as, in cultivation, never expanding its male flowers; which I have found to be normally the case with hybrids of *C. Hornschuchiana.*—*C. Oederi* Retz. 107. By the loch lying at the northern base of Ben Griam More. 111. South shore of Loch Stenness, east of the hotel.

Agrostis canina L. var. *scotica* Hackel. 106. Ben Wyvis, apparently scarce.

Deschampsia discolor R. & S. 108. West end of Loch Modsarie, in small quantity.

Avena pubescens Huds. 111. Cliffs, Waulkmill Bay.—*A. strigosa* Schreb. 108. A weed in oatfields at Tongue; as is *A. fatua* L. at Coalbackie.

Koeleria cristata Pers. 111. Loch of Skaill.

Briza media L. 109. Left bank of the Thurso River, near the foot-bridge, in very small quantity; one of the rarest northern grasses.

Glyceria plicata Fr. 111.* By several small ponds between Stromness and Sandwick, together with *G. fluitans* R. Br. and *G. pedicellata* Towns. By Mr. Townsend's kind permission I give the following extract from a letter of his:—"I think you are right in supposing *G. pedicellata* a hybrid. I have never found it in seed, though searched for for innumerable years. The anthers never expand, and the cells are divergent and yellow; those of *fluitans* are purple, and equally broad at either end; those of *plicata* and *declinata* are much shorter, but similar. Babington did not, I think, believe in hybrids at the time I described *pedicellata*. I first named it *hybrida*, but he persuaded me to alter the name."

Cystopteris fragilis Bernh. var. *dentata* Hooker. 111. Dwarfie Hamars, Hoy.

Equisetum palustre L. var. *nudum* Newm. 111. Orgill, Hoy.

Isoetes echinospora Dur. 108. Loch Modsarie.

Chara fragilis Desv. 111. Peat-bog west of Stromness; approaching var. *barbata*.—*C. aspera* Willd. 111. Mill-pond between Stromness and Sandwick.—Subspecies *desmacantha* H. & J. Groves. Loch Stenness and Loch Harray; a very dwarf form of it.—*C. baltica* Bruzel. 111.* South side of Loch Stenness; a very interesting and unexpected discovery, the only previous British localities being in the extreme south (Dorset and West Cornwall). The identification is due to Mr. Crawford, who collected it there in August; it was confirmed by Messrs. Groves in both cases.—*C. vulgaris* L. 111. Ditch near the Dwarfie Stone, Hoy. — Var. *longibracteata*. Near Stromness.

Nitella opaca Agardh. 108. Exceedingly variable both in size and habit in Loch Deerie, near Tongue, where I quite thought that I had found three different species; all were, however, referred to *opaca* by Messrs. Groves, who remark that they represent a very interesting series of forms. 109. Ditch near the Wick River. 111. Near Stromness, Mainland; pool between Orgill and Rackwick, Hoy.

THREE NEW VARIETIES OF HYPNUM FLUITANS L.

By H. N. Dixon, M.A., F.L.S.

It requires some courage to propose a new variety of this species, already so prolific in varieties and subvarieties (forty-nine forms find names in Sanio's scheme, Bot. Centralblatt, 1883); perhaps indeed it demands some apology. A large number of our British forms have passed through Mons. Renauld's hands since the publication of his Monograph of the Harpidioid Hypna in Husnot's *Muscologia Gallica*; nearly all of these have been assigned more or less readily to one or other of the varieties described in that system; but two forms which I recently sent to him differ from any of these varieties in a marked degree, sufficiently so in M. Renauld's opinion to demand their separation as varietal forms. He has kindly suggested that I should associate my name with his in publishing these, and the following diagnoses are mainly drawn up from the notes and drawings with which he has furnished me.

H. fluitans L. (*amphibium*) var. Robertsiæ Ren. & Dixon, var. nov. Floating; *variegated with yellow, golden brown, and purplish red, glossy;* stems elongate, almost simple, with a few short, distant branches only. Leaves rather closely set, *erect-spreading*, only very slightly falcate-secund at the tips of the branches, narrow-lanceolate, gradually tapering to a *long, fine, sharply-toothed subula*. Nerve narrow, scarcely reaching half-way up the leaf. Cells long, narrow, *thick-walled*, the basal somewhat incrassate, slightly porose.

Hab. In a bog near Craig-lyn-Dyfi, Llan-y-mawddwy, Merioneth, North Wales, alt. 2000 ft., Sept. 1898, *Miss M. Roberts*.

Allied to var. *setiforme* Ren., differing in the shorter leaves, the colour of the tufts, mixed with a purplish red, and especially by the cells with the walls *incrassate*, the basal ones slightly porose. This character brings it near to the *falcatum* group, and especially to var. *anglicum* f. *Holtii* Sanio (*Amblystegium fluitans* var. η *Holtii* Sanio, Braithw. Brit. Moss Fl. iii. 51), from which it differs in the colouring, glossy leaves, less-branched stems, etc. The line of demarcation between the groups *amphibium* and *falcatum* is at times not very clearly defined, and there are certain forms for which it is not easy to determine the most satisfactory position, the present variety being one of these. It is a very pretty plant, the glossy, variegated colouring being unusual.

H. FLUITANS L. (*amphibium*) var. SQUALIDUM Ren. & Dixon, var. nov. In dense intricate masses, *pale dull green above, of a dirty reddish brown below*. Stems little-branched, *rather robust*, the leaves somewhat complanate-spreading, falcate in upper part of stem and branches, rather large, lanceolate, *somewhat abruptly terminating in a fine, faintly-toothed, almost piliform subula*. Other characters as in var. *Jeanbernati* Ren.

Hab. In stagnant water, Dawley, Shropshire, May 11, 1896; *Rev. W. H. Painter*.

This variety is nearly allied to var. *Jeanbernati* Ren., from which it differs in the fine subula of the leaves, as well as in the habit. The stem-leaves are widely complanate-spreading, giving the appearance of some aquatic forms of *H. riparium* L.—it was indeed at first sent me as *H. riparium* var. *splendens* De Not.

A third variety has perhaps a still greater value than the two described above, seeing that its ascertained distribution is much wider. A plant collected somewhat extensively by Mr. J. A. Wheldon and Mr. A. Wilson in Lancashire, on elevated moorlands, and again by Mr. W. Ingham in Yorkshire, has for some time given rise to discussion. Its short nerve, the scarcely secund, wide leaves, shortly and broadly pointed, the loose areolation and very indistinctly defined auricles, gave it a very different character from that usually obtaining in this species. Under his somewhat heterogeneous group "*a obsoletum*," Sanio has described a var. *Holleri* having very nearly the same characters, and M. Renauld at first referred our plants to this, ranking them under var. *Jeanbernati* as f. *Holleri* Sanio. In a letter recently received from him, however, he writes: "Cette détermination est, à la rigueur, acceptable; cependant comme la var. *Holleri* Sanio est mal conçue et mal décrite, et que d'ailleurs le groupe *obsoletum* Sanio est très confus je préfère aujourd'hui fonder une variété nouvelle qui doit être placée à côté de la var. *Jeanbernati* Ren." For this variety M. Renauld proposes the name *atlanticum*, and has drawn up the following description :—

H. FLUITANS L. (*amphibium*) var. ATLANTICUM Ren. Forme voisine de la var. *Jeanbernati* Ren., dont elle diffère par la couleur *verte*, le tissu chlorophyllien, les feuilles plus larges, ovales puis *rapidement* rétrécies en un acumen *court;* nervure un peu plus large (58–64 μ au lieu de 46–48 μ), tissu basilaire plus lâche, cellules moyennes *plus larges* et plus courtes.

Hab. England: R. Wyre, West Lancs., coll. Albert Wilson, 1900 (*Wheldon*, No. 9). Summit of Pendle Hill, Lancs., alt. 600 met., coll. J. A. Wheldon, July, 1898.

France: Meymac (Corrèze), alt. 900 met., coll. Lachenaud, 1901.

Forma *gracilis* Ren. Plante plus grèle, feuilles plus petites mais de même forme que le type, nervure plus étroite, tissu plus lâche que dans la var. *Jeanbernati*.

Hab. England: Arncliffe Wood, Yorkshire, 1900, coll. W. Ingham (*Wheldon*, No. 19).

Prof. Barker, I may add, sends me the var. *atlanticum* from North Derbyshire, where he says it occurs abundantly on some of the moorlands. In some parts of Lancashire Mr. Wheldon finds it one of the most predominant forms of *H. fluitans*.

A NEW *PHILODENDRON*.

By A. B. RENDLE, M.A., D.Sc.

Philodendron crassum, sp. nov.

Herba caudice brevi crasso procumbente; foliis confertis, petiolo $\frac{2}{3}$ laminæ vix æquante, crassissimo, subfusiforme subterete, facie autem superiore paullo concavo cum acietibus marginalibus brevibus; lamina elliptico-ovata ad subellipticam, apice apiculata, supra nitida, costa apicem versus cito evanescente, nervis lateralibus subæqualibus ascendentibus; pedunculo dimidium spathæ vix superante; spatha suboblonga obtusa ad basin evoluta, intus e fundo purpurea, superne albida; spadice spatham æquante, parte fœminea masculæ dimidiam partem subæquante, parte mascula sterili quam feminea breviore, staminodiis ovaria excedentibus infimis clavatis; ovariis plurilocularibus, ovulis paucis, stigmatibus late capitatis; staminibus ovaria excedentibus.

A plant with the habit of *P. cannæfolium* Mart. The adult leaves have a leaf-stalk 22–23 cm. long with the greatest thickness 4·2 cm. about one-third the distance above the base, narrowing to about 1·6 cm. just below the blade; the shallowly concave upper surface reaches 3 cm. in width at the thickest part; it is bounded by low subacute edges. The blade reaches 36 cm. in length by 17 cm. in width below the middle; it shows no pre-eminent secondary veins. The petiole has a spongy internal structure, with the intercellular spaces lined with mucilage. The spathe is 13·5 cm.

long by 4 cm. broad; the female area of the spadix 4 cm. long, the male 7·5 cm., including the sterile portion of 2·5 cm.; the ovary 2 mm. long, the stamens 2·5 mm. by 1·5 mm. broad across the top.

The species is most nearly allied to *P. cannæfolium*, but is distinguished by its more shortly stalked elliptic-ovate leaves, which show, moreover, no pre-eminent secondary veins.

The plant is in the collection of Mr. A. H. Smee, at Hackbridge, Surrey, where it flowered six years ago, and again early last April, opening with daylight and beginning to close about five o'clock in the afternoon. Mr. Smee received it some years ago from General Macdonnell, from Rio de Janeiro. There is no information as to where it was collected, but presumably it was in the neighbourhood of Rio, or at some spot within easy access.

SHORT NOTES.

MIDDLESEX ORCHIDS.—In this Journal for 1890 (p. 120) I referred to the remarkable abundance of orchids on our chalk hills in the summer of 1889, especially mentioning *Orchis pyramidalis* as thickly covering the Harefield and Springwell downs. Since that date not a single plant has appeared above ground. Even should it reappear next June, thirteen years must surely be an abnormally long period of rest, and the fact that the longest previous gap was five years only, goes far to suggest that it is so. I was at first inclined to attribute this failure to the persistent droughts we have experienced since 1891, but *O. latifolia* failed to appear in the marshy Frogs' Meadows, and, on the other hand, *Ophrys muscifera* came up on the chalk every year without a break: these instances lend little support to the theory. In any case the behaviour of the orchid tribe is, to me, a perpetual puzzle. The lavish distribution of 1889 would seem to have been general, for, botanizing on the Surrey hills in June and July of that year, I found the same profusion everywhere, and it would be interesting to learn if a similar scarcity up to the present time has been noticed in that and other districts. I may add that, whilst searching for *Gymnadenia conopsea* (last seen in 1891) under Garret Wood, near Springwell Lock, I gathered *Helianthemum vulgare*, a common species which, strange to say, has not yet been reported from Middlesex.—J. BENBOW.

RUBIA ROTUNDIFOLIA Banks & Sol.—This species, although duly included in the *Index Kewensis*, seems to have been overlooked by systematists: it is not mentioned in DC. *Prodromus*, or in the *Flora Orientalis*. It is, however, duly published with a short diagnosis—"foliis quaternis sessilibus subrotundo-ovatis acuminatis ciliatis utrinque lævibus, caule inermi"—in Russell's *Natural History of Aleppo*, ed. 2, ii. 267 (1794); and a comparison of specimens shows its identity with *R. Aucheri* Boiss. (Diagn. Ser. I. iii. 54 (1843)), a name which it displaces. Patrick Russell's plants are in the National Herbarium; the specimen in question is labelled

"Syria montes prope Antiocham." Dr. Rendle has already cited in this Journal (1900, p. 81) the passage in Russell's book which indicates that the species established therein should be ascribed to Banks and Solander jointly.—James Britten.

Jungermania saxicola Schrad. — In Part xx. just issued of Mr. Pearson's important work on British Hepaticæ, the claim of *Jungermania saxicola* to be considered a British species rests on a single gathering made by the late Dr. Greville in the Shetland Isles. In November, 1898, in carefully examining a collection of Scotch hepatics made at Balmoral in 1894, I determined one specimen gathered near Braemar to be *J. saxicola.* Owing to eye troubles, this was laid aside until within the last few days, when I sent it to Mr. Pearson, and he has confirmed the decision.—G. Stabler.

Pembroke Plants.—The following plants, which, so far as I am aware, are hitherto unrecorded for the county, I gathered, with one exception, during a visit to Tenby from June 18th to 29th last:—*Orchis incarnata* L. Penally Marsh, abundant. Both this species and *O. latifolia* were growing there, and, though well-marked examples could be gathered of each, there were plants which it was extremely difficult to assign to either, and the question naturally arose—were these hybrids, or intermediates connecting the two species? — *O. incarnata* × *maculata.* This hybrid was gathered growing among plants of well-marked *incarnata.*—*Epipactis palustris* Crantz. Abundant near the Black Rock, Tenby, but of course only in bud at this date. I am indebted to Mr. J. E. Arnett, of Tenby, for information which enabled me to collect this species, and also for beautiful flowering examples gathered later. — *Juncus Gerardi* Lois. Swamp near railway, Tenby; abundant. — *J. effusus* × *glaucus.* Penally Marsh; several clumps were observed. — *Carex lævigata* Sm. Penally.—*Phegopteris calcarea* Fée. Mr. J. E. Arnett has collected this at Precelly. In addition to the above I may mention *Carex paludosa* Good., which occurs in fair quantity in Penally Marsh, and is queried for Pembroke in Top. Bot.; and *Agropyron junceum* Beauv., which is quite common on the Burrows at Tenby, but which is not recorded in Top. Bot., although it is entered in Dr. R. W. Falconer's "Contributions towards a knowledge of Tenby plants" (1848), and is also included in Babington's paper "On the Botany of South Pembrokeshire" in this Journal for 1863 (pp. 258–270). Mr. Arthur Bennett has kindly verified the Carices.—Richard F. Towndrow.

Radnorshire Plants. — During a short visit this summer to Llandrindod Wells, I observed the following interesting plants in the immediate neighbourhood:—*Carum verticillatum* Koch, abundant by the lake; *Dianthus deltoides*, near quarries in several places; *Cnicus pratensis* Willd., near Howey; also a considerable number of sedges, including *Carex lævigata* Sm., in wood near the lake. The botanical part of a local guide is generally so feeble and disappointing, that I refer with much pleasure to an interesting list contributed to Bufton's *Guide* by the late Rev. John B. Lloyd, of Liverpool. It contains over three hundred plants observed by him within two miles of Llandrindod, nearly all of which I identified. The *Carum* is included, and would, I think, be first record for the county.—Wm. A. Clarke.

The Plates of 'English Botany,' ed. 3 (p. 245).—Most of the fresh plates and alterations in the third edition of *English Botany* were done by J. E. Sowerby. After his death, in 1870, Fitch did some. For the Supplement, N. E. Brown drew his own plates.—J. G. Baker.

NOTICES OF BOOKS.

Flora Capensis. Vol. v. Part i. Acanthaceæ by C. B. Clarke; Selagineæ by R. A. Rolfe; Verbenaceæ by H. H. W. Pearson. 8vo, pp. 224. London: Lovell Reeve. Price 9s. net.

The gratifying progress now making by the *Flora Capensis* justifies the hope that the work may be completed within half a century of the date of its commencement. It is, of course, obvious that by that time the earlier volumes will be, as indeed they are already, practically useless as an enumeration of South African plants—it will be remembered that a period of more than thirty years elapsed between the issue of the third volume in 1865 and the resumption of the work in 1896; but it may be hoped that steps are being taken for a reissue of these, brought up to the standard of our present knowledge.

The part just issued is mainly the work of experts. Mr. C. B. Clarke had previously monographed the *Acanthaceæ* for the *Flora of Tropical Africa;* and Mr. Rolfe has for many years made the *Selagineæ* his own. Mr. H. H. Pearson's treatment of the *Verbenaceæ* is in marked contrast to the remainder of the work in the length of the descriptions, which seems to us in many instances to be greatly in excess of what is needed in a handbook such as we always understood to be aimed at by the originators of the series of colonial floras. This is not only noticeable in genera containing novelties and critical species, such as *Vitex*, where 9 species occupy 6½ pages, but in genera such as *Lippia*, where so wide-spread a weed as *L. nodiflora* takes more than half a page to describe. This mode of treatment is in striking contrast with Mr. Clarke's work, in which some new species are disposed of in four, three, or even in two—e. g. *Justicia cheiranthifolia*—lines. Making every allowance for divergence of treatment, we should have thought that something more nearly approaching uniformity might have been secured by the editor of the later parts of the Flora, as it was by Harvey in the earlier volumes.

It is to be regretted that certain bibliographical eccentricities to which we called attention in noticing earlier portions of the work are still allowed to disfigure its pages. The placing in brackets of the name of the authority for a species is not only unusual, but absolutely misleading, as it has now a generally recognized and different significance. It is true that Harvey so printed the names forty years ago, but his model has been departed from in so many other matters that the retention of this misleading method can hardly be justified on the score of uniformity; it is moreover out of harmony with the plan of the other colonial floras. The printing of the adjectival forms of proper names without a capital letter is a recent Kew eccentricity which we had hoped to have seen abandoned; it is not in accordance with precedent (either in the earlier volumes of the work or in the other colonial floras) or with custom, either at home or abroad: neither the American nor the Berlin rules adopt it; and it is flatly opposed to the Decandollean "laws," which say: "Whatever be the form chosen, every specific name derived from the name of a person should begin with a capital letter."

Another unsightliness which tends to confusion is the printing in italics not only the synonymy, but also the names of the authors and books cited: this renders the synonyms difficult to distinguish. In the earlier volumes of the work the same difficulty was not felt, as the synonyms and references were few; now they often extend to twelve or thirteen lines, and occupy more space than the description of the plant. It is, we think, to be regretted that the earlier plan, by which synonyms and references were mainly confined to those which pertained to the plant in its connection with South Africa, has given place to something like a complete bibliography. This, it seems to us, is entirely out of place in a work of the kind; it must add materially to the cost and extent of the Flora, and thus render it much less convenient for use in the field.

We note that Mr. Rolfe has a new species, *Selago Mundii*, named from a collector whom he calls "Mund." According to Harvey (Gen. S. Af. Pl. 26), Kunth in establishing his genus *Mundia* fell into a similar error; Harvey considered it was "intended to commemorate the services rendered to botany by M. Mundt, a most meritorious collector of South African plants," and he accordingly altered the spelling to *Mundtia*, in which form it appears in Bentham & Hooker's *Genera*, and in many other books. It is not, however, quite certain that Kunth had Mundt in view,* and in any case the spelling as published, both in this and in Mr. Rolfe's case, must stand, in accordance with the practice which has accepted *Cinchona* in preference to the more etymologically correct *Chinchona*.

Handbuch der Systematischen Botanik. Von Dr. Richard R. v. Wettstein, Professor an der Universität Wien. Bd. I. 8vo, pp. iv, 201, tt. 126. Leipzig & Wien: Fr. Deuticke. 1901.

The object of this new handbook is to give a more detailed account of the systematic phase of botany than is contained in the general text-books. The author intends also to pay special attention to questions of phylogeny. To these ends the more important types will be reviewed and illustrated as fully as possible, while stress will be laid upon those whose development is of special importance from the phylogenetic point of view.

---

* See a note in this Journal for 1889, p. 262.

The present volume contains a general introduction and the first instalment of the special portion, comprising an account of the Thallophytes. Volume ii., containing the Cormophytes, is promised for next year. The general introduction, which occupies forty-four pages, contains a short history of the evolution of systematic botany, and a sketch of the value of homology, embryology, geographical distribution, and other factors in determining phylogenetic relationships.

At the commencement of the special part Professor Wettstein gives an outline of the classification which he adopts. The plant world, he says—as far as our present knowledge goes—includes organisms belonging to seven great developmental series, or stocks, as follows:—

i. Myxophyta.	iv. Euthallophyta.
ii. Schizophyta.	v. Phæophyta.
iii. Zygophyta.	vi. Rhodophyta.

vii. Cormophyta.

Stocks i.-vi. are considered in the present volume, and the majority indicate by their name the character of the organisms included. Myxophyta are the Myxomycetes, including also *Plasmodiophora*. Schizophyta comprise the two divisions fission-algæ and fission-fungi, or the old *Cyanophyceæ* and the Bacteria, which are generally thus associated in recent arrangements. Zygophyta contains the *Peridineæ* (which, if plants, must be put somewhere), the *Bacillarieæ* or Diatoms, and the *Conjugatæ*, the latter comprising the three families *Desmidiaceæ*, *Zygnemaceæ*, and *Mesocarpaceæ*. Euthallophyta include two classes—one the *Chlorophyceæ*, or the rest of the green algæ, and a second the Fungi. Phæophyta and Rhodophyta are the brown and red algæ as generally understood. Thus the important departure from systems generally in vogue is the bringing together of the green algæ and the Fungi in one group, and the exclusion at the same time of the two other large groups of sea-weeds. If, however, we accept the view of the evolution of the Fungi as a whole from a common algal stock, there is no doubt that the most nearly allied algæ are to be found among the *Chlorophyceæ*, and Prof. Wettstein is therefore phylogenetically justified in his distribution of the groups. But as a matter of convenience we much prefer the more usual method, such as, for instance, is adopted in Prof. Engler's *Pflanzenfamilien*—namely, the consideration of the great groups of Algæ as one section, and the great group of Fungi as another section of the subkingdom Thallophyta. Even if we grant that the Fungi have sprung from a common algal stock, which presumably finds its nearest representative in the *Chlorophyceæ*, we must bear in mind the great development along widely diverging lines that has occurred since the origin of the group, which development removes it as a group far more widely from the Algæ, considered as a whole, than the generally received subdivisions of Algæ are removed from each other.

We shall be much interested to see Prof. Wettstein's treatment of the seventh stock, Cormophyta, and to hear his reasons for lumping into one series everything which is not a Thallophyte. It is a curious inversion of the old system, which was of course merely an expression of ignorance, where everything which was not a flowering plant was a Cryptogam.

As regards the elaboration of individual series, their subdivision is on familiar lines, that of the Fungi being based on Brefeld's arrangement. A special feature is the number and excellence of the illustrations. These will ensure the book a welcome by the ordinary student, who will probably not be greatly disturbed by departures from the more generally adopted arrangement of the larger groups.

A. B. R.

Grasses. A Handbook for use in the Field and Laboratory. By H. Marshall Ward, Sc.D., F.R.S. Pp. viii, 190, tt. 81. Cambridge University Press. 1901. Price 6s.

Professor Marshall Ward's book on Grasses is the latest addition to the biological series of the Cambridge Natural Science Manuals. It is not intended to be a complete manual of Grasses, but "an account of our common native species, so arranged that the student may learn how to closely observe and deal with the distinctive characters of these remarkable plants when such problems as the botanical analysis of a meadow or pasture, of hay, of weeds, or of 'seed' grasses are presented, as well as when investigating questions of more abstract scientific nature." With this end in view, the author has elaborated a series of chapters in which the species are arranged (1) according to their vegetative characters; (2) according to the anatomical characters of the leaf; (3) according to their flowers and inflorescences; (4) according to the grain. These arrangements represent the expenditure of considerable labour; but, while one realizes the interest attaching to the process of elaboration, it is difficult to regard them otherwise than as a sort of botanical exercise. The student who is able to use any one of these systems could quite well avail himself of the more scientific system of a good British Flora—more scientific because the general aggregate of characters is its basis, while by its use the student learns to appreciate the relative value of the individual factors. We grant that it may be useful to run a grass down from vegetative characters only, but so many of the characters are comparative, that the system when we are dealing with individual and often incomplete specimens is apt to fail at the crucial point, and practically in working with a limited flora like our own, a series of carefully preserved and properly determined specimens for purpose of comparison will be far more helpful than a tabular scheme. And, after all, this is at least as scientific a method as one depending on a single set of characters.

In addition to the chapters on classification, there are several on the general structure and biology of grasses, forming a useful introduction to a more detailed study of the order.

The text, for the size and character of the book, is well illustrated, but the great majority of the figures are borrowed, with due acknowledgment, from well-known works, chiefly of German origin, and, this being the case, it is not easy to understand why it is necessary to charge six shillings for the volume. Fischer of Jena would have produced it, with plenty of original illustrations, for three marks. The book, though not without some value as an introduction to the study of a family of great botanical and infinite economic interest, can hardly be considered so indispensable as to demand a price which is, from the student's point of view, exorbitant. Perhaps, to quote a student's remark, "they don't expect to sell many."

A. B. R.

Histoire de l'Abrotonum. Signification de la désinence ex *de quelques noms de plantes.* Par le Dr. Saint-Lager. Paris: J. B. Baillière. 1900. Pp. 48.

The subject of this pamphlet is twofold, as shown in the above title: (1) to correct the spelling of the name usually given as *Abrotanum*; and (2) to consider the meaning of the ending "ex" in certain plant-names. As to the first, the author has no difficulty in showing that the name was originally written as he gives it; that botanists including Caspar Bauhin have since mis-spelled it, and even induced a false derivation, based on the error. Dr. Saint-Lager is an untiring stickler for reform in naming, far beyond anything advanced by the most revolutionary of present-day reformers, for he would willingly go behind Linnæus. His views are so well-known that it is needless here to dwell much on them, especially as none of the disputants in the nomenclature question seem disposed to adopt them. The author even goes so far in his zeal as to misquote Besser's *Tentamen de Abrotanis* . . . as "Tent. Abroton." (p. 21); even Camerarius and C. Bauhin are similarly treated, which is unpardonable. Once, indeed, the author cites *Tentamen Abrotanorum*, probably by oversight.

Apart from these special peculiarities of the author, there will be found a large amount of interesting matter in these pages. Passing from the form of the name, Dr. Saint-Lager proceeds to discuss the geographic origin of *Artemisia Abrotanum* Lam., finally suggesting that it is merely a cultivated form of *A. procera* Willd.

The latter part of the pamphlet is devoted to a consideration of the plant-names ending in *ex*, such as *Ulex*, *Ilex*, *Rumex*, and *Carex*. With these he compares the animal-names having a like ending, of which he gives a long list, and states that it probably is the same as the prefix "ac," conveying the idea of something sharp or pointed.

B. D. J.

ARTICLES IN JOURNALS.[*]

Annals of Botany (June). — M. Ferguson, 'Development of pollen-tube and division of generative nucleus in Pines' (3 pl.).— F. O. Bower, 'Imperfect sporangia in Pteridophytes.'—A. H. Trow, 'Biology and cytology of *Pythium ultimum*, sp. n.' — G. Massee & E. S. Salmon, 'Coprophilous Fungi' (2 pl.). — L. A. Boodle, 'Anatomy of *Schizæaceæ*' (3 pl.).

Botanical Gazette (20 June). — J. H. Schaffner, 'Life-history of *Erythronium*' (6 pl.).—H. M. Hall, 'Californian Plants' (1 pl.).— A. Nelson, 'Rocky Mountain Plants.' — E. B. Copeland, 'Geotropism of Stems.'

Bot. Zeitung (15 July).—K. Giesenhagen, '*Taphrina, Exoascus & Magnusiella*.'

Bull. de l'Herb. Boissier (30 June). — H. Hallier, 'Pflanzen aus dem Malaiisch-Papuanischen Inselmeer' (4 pl.). — E. Penard, *Phytelios loricata*, sp. n. — R. Chodat, 'Variation numérique dans *Orchis Morio*.'—G. Hegi, 'Das Obere Tösstal' (cont.).

Bull. Soc. Bot. Belgique (xl. 1; 29 June).—Th. Durand & E. de Wildeman, 'Matériaux pour la Flore du Congo.'

Bull. Torrey Bot. Club (19 June; received 6 July). — M. A. Howe, '*Acicularia* and *Acetabulum*' (2 pl.). — C. C. Curtis, 'Transpiration and the resistance of stems.'—E. J. Durand, 'The genus *Holwaya*' (1 plate). — J. K. Small, 'Shrubs and trees of the Southern States' (cont.).

Gardeners' Chronicle (29 June).—W. B. Hemsley, 'Tree Lobelias of Tropical Africa' (fig. 156).

Journal de Botanique ("Mai"; received 28 June). — C. Sauvageau, 'Les Sphacélariacées' (cont.).—P. Parmentier, 'Recherches sur le pollen des Dialypétales.'—M. Col, 'Recherches sur l'appareil sécréteur des Composés.'

Nuovo Giorn. Bot. Ital. ("April"; received 2 July).—J. Bresadola & F. Cavara, 'Funghi di Vallombrosa.' — L. Micheletti, *Erigeron Karwinskyanus* var. *mucronatus*. — Th. Giovannozzi, 'I movimenti igroscopici delle piante' (1 pl.). — A. Béguinot, 'Flora dei depositi alluvionali del Tevere.'

Oesterr. Bot. Zeitschrift (July). — P. C. Franz Vrba, 'Zur Anatomie der Achsen von *Alyssum saxatile*.' — E. Hackel, 'Neue Gräser.' — A. V. Hayek, 'Zur Flora von Steiermark.' — J. Velenovský, 'Zur Moosflora von Montenegro.' — F. Stephani, 'Die Elaterenträger von *Calycularia*.' — M. Soltokovic, 'Die perennen Arten der *Gentiana* aus der section *Cyclostigma*' (cont.).

Rhodora (June). — J. R. Churchill, E. F. Williams, M. L. Fernald, C. G. Kennedy, & J. F. Collins, 'Botanical Excursion to Mount Katahdin.'—J. F. Collins, 'Bryophytes of Maine.'

---

[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society held on June 20th, a paper by Messrs. W. West and G. S. West was read, "On the Freshwater Algæ of Ceylon," founded on material collected by Mr. W. G. Freeman in 1896–97 at various localities in the island. Representatives of almost all the families of Freshwater Algæ were obtained, and two of the collections were especially rich in *Desmidieæ*: altogether 395 species were collected. The Desmids observed were essentially tropical in character, and not very dissimilar to those of Northern India, Burma, Singapore, and some of the East India Islands, a noteworthy feature being the presence in Ceylon of a large number of species which occur in Madagascar. There was also a marked resemblance between the algal flora of Ceylon and that of Northern Queensland, and the only two species known from Hongkong were each found both in Ceylon and Queensland. The investigation of these collections had resulted in the discovery of some sixty new species, many of which deserved special mention on account of their extraordinary forms. Messrs. George Massee and E. S. Salmon communicated a paper "On Coprophilous Fungi."* Mr. N. E. Brown read a paper entitled "A Revision of the Genus *Hypericophyllum*, with Notes on certain allied Genera of *Compositæ*." After pointing out that the genus *Hypericophyllum* had been founded by Steetz on a remarkable plant collected by Peters in Portuguese East Africa, and that specimens of it were so rare in collections that much misapprehension prevailed regarding it, he remarked that Bentham had united it with the genus *Jaumea* Pers. An examination, however, of the material now available had demonstrated that this view was untenable; he regarded *Hypericophyllum* as quite distinct from *Jaumea* in its distribution, habit, and appearance; in the possession of glands in its leaves and tissues; and in its remarkable pappus, the hooked bristles of which appeared to be unique in this order. He therefore proposed to restore this, with three other genera, to their former generic rank, and furnished a key to their distinctive characters. In addition, he described a new species (*H. scabridum*) from British Central Africa, whence specimens had been received from Nyassaland between Kondowe and Karonga, from the Manganja Hills, and from the Shiré Highlands, near Blantyre.

Dr. Oscar Loew has discovered a new enzyme, which he has called Catalase. He found that an extract of tobacco-leaves retained the power of decomposing hydrogen peroxide after the other known enzymes had disappeared. He was thus led to investigate the subject, and found the new enzyme, which exists in two forms, soluble and insoluble. Its chief property is its catalytic action on hydrogen peroxide, and it is of universal occurrence, as Dr. Loew has proved, both in the higher and lower plants In the various metabolic changes in the cell, a substance such as hydrogen peroxide would be continually formed, and would, if retained, be deleterious to the life of the plant. Dr. Loew supposes, therefore, that catalase may render great service in catalysing the peroxide as soon as it is formed. He found it, though not in large quantities, in the leaves of herbarium specimens that had been collected in 1841. The results of his investigation are published in Report No. 68 of the U.S. Department of Agriculture.

---

* [This is apparently the paper by the same authors printed in the *Annals of Botany* for June, but no reference is there made to its having been read before the Linnean Society.—Ed. Journ. Bot.]

THE S. P. C. K. has issued a neat little half-crown volume on *Poisonous Plants in Field and Garden* by the Rev. G. Henslow, the utility of which is not obvious. The number of plants which are practically a source of danger is extremely limited, and an illustrated account of these might be useful; but this volume includes a small amount of information about a large number of species, with the usual quotations from other authors, and a number of figures which have already done duty in various works. It is systematically arranged, but even the orders are not characterized: thus we are told that our British *Leguminosæ* "are easily known by the peculiar form of the flower," but this is not described further than by saying it has "an imaginary likeness to a butterfly." Many of the species are undescribed, save by a phrase which would apply equally to others: *e.g.* the only information as to *Orobanche minor* is that it "is parasitic on clover and several other plants," which is equally true of *Cuscuta*. Why does Mr. Henslow say that the "Harebell of Scotland" is *Scilla nutans?* It is certainly not the plant of the "Lady of the Lake."

THE third Appendix to the non-existent *Kew Bulletin* for 1901 contains a list of the "new garden plants of the year 1900," with a reference to the place of their publication. "These lists," we are told in a prefatory note, "are indispensable to the maintenance of a correct nomenclature," but this statement seems to need qualification, as we are further told that "in every case the plant is cited under its published name, although some of the names are doubtfully correct." The latter remark is certainly true: *e.g.* the first name upon which our eye fell was "Chamælirion Carolinia," which stands in the *Index Kewensis* as *Chamælirium carolinianum*.

THE death of Dr. EMIL BRETSCHNEIDER, which took place on or about May 14, has deprived Chinese botany of one of its most assiduous students. For thirty years he has devoted unremitting attention to the investigation of its history; his first essay, *On the Study and Value of Chinese Botanical Works*, was published at Peking in 1870–1; and his last work, *History of European Botanical Discoveries in China*, appeared in 1898. Of this important volume—a very storehouse of information concerning the progress of botany in China and the investigators who have contributed to our knowledge thereof—an appreciation appeared in this Journal for 1899 (pp. 86–88), in which also, in 1894 (pp. 292–298), was printed a paper from his pen, "On Some Old Collections of Chinese Plants." Bretschneider's knowledge of plants, although he made some collections, was mainly confined to those of pharmaceutical interest; but he has done much to render accessible to Europeans the information contained in Chinese botanical works.

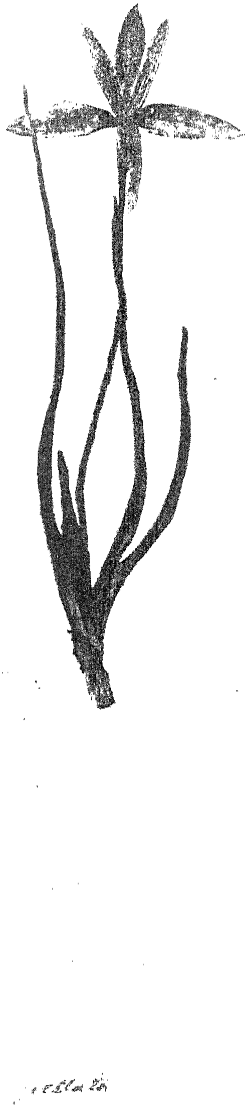
It is a matter for satisfaction that Bretschneider did not adhere to his intention to delay the publication of his *magnum opus* until the completion of the *Index Flora Sinensis.* "It is not to be foreseen," he wrote in 1898, "when Mr. Hemsley's admirable work, interrupted more than four years ago, will be brought to an end"; and its conclusion still seems equally remote. Since 1891, only two parts of the *Index*, amounting together to 142 pages, have been published—one in 1894, the other in 1899; and it is needless to point out that such delays are fatal to anything like a complete presentment of our knowledge of the Chinese flora at any definite date—the earlier portions (1889–91) must be hopelessly behind the later in completeness, and the book as a whole is thus rendered useless for statistical purposes. We would urge upon the Council of the Linnean Society—in whose Journal the *Index* appears, although we understand they are not primarily responsible for its publication—to take all steps in their power to ensure the speedy completion of the work. We understand a large portion of the manuscript has for some time been ready, and it should not be difficult to remove any obstacles to its speedy publication.

We have before called attention to the inconvenience likely to arise from the publication of plants as new species in two places, without any indication in the later publication that the descriptions have already appeared. An example of this may be noticed in *Malpighia*, vol. xiv. fasc. ix–xii, pp. 425-456 (dated 1900, but not issued till 1901), where Prof. Lopriore publishes as "Amarantaceæ novæ" some genera and a large number of species which he had previously published in *Botanische Jahrbücher*, xxvii. 37–60, as long ago as April, 1899. We can, however, find no reference in *Malpighia* to this earlier publication: on the contrary, the terms "nov. gen." and "n. sp." are employed in such a way as to imply that the plants are new. The fact that the two papers are not entirely identical is likely to add to the confusion which this method can hardly fail to cause.

Mr. Aven Wilson seems to have hit upon a new mode of adding to unnecessary synonymy, by the creation of synonyms for "homonyms"—at least, that appears to us to be the outcome of his note in the *Botanical Gazette* for June, p. 407, which runs as follows:—"*Arnica multiflora* Greene, Pitt. 4: 162, evidently is *A. Columbiana* Aven Nelson, Bot. Gaz. 30: 200, since both are, in part, founded on the same collections and the same numbers are cited. The latter name is the earlier by two or three months. Dr. Greene's *A. Columbiana* (Pitt. 4 : 159) having thus become a homonym it may become *Arnica Greenei*, n. n."

An article on the Tree Lobelias of Tropical Africa in the *Gardeners' Chronicle* for June 29 is accompanied by a picture from a photograph of these remarkable plants, two of which were described and figured by Mr. E. G. Baker in this Journal for 1894. These are not referred to by Mr. Hemsley, but his article contains a reference to "*L. squarrosa* Baker f."—a name which we are unable to trace.

Erratum.—P. 245, l. 19 from bottom, for "Whichelmore" read "Michelmore."



Hypoxis stellata (*specimen Linnæanum*).

ON *IANTHE*, A GENUS OF HYPOXIDACEÆ.

By Frederic N. Williams, F.L.S.

(Plate 425.)

In the two editions of *Species Plantarum* Linnæus describes eleven species of *Amaryllis*. Afterwards, in the twelfth edition of *Systema Naturæ* (1767), he describes another, *Amaryllis undulata* (now known as *Nerine undulata* Herb.). Lastly, *A. dubia*, though usually cited as of Linnæus (and now known as *Hippeastrum equestre* Herb.), is described in a paper read by J. Alm in June, 1775, and afterwards published in the eighth volume of *Amœnitates Academicæ* (1785), edited by Schreber seven years after the death of Linnæus. Other species were subsequently without adequate consideration adduced to the loosely characterized *Amaryllis* of Linnæus, until Ker, Dean Herbert, and others, so disintegrated the genus, that in its depleted state it is now represented in the *Index Kewensis* by a single species, *Amaryllis Belladonna*. Link, to include this plant, characterized much more satisfactorily the genus *Callicore*,* taking up the plant under the name of *C. rosea*, which is an eminently suitable name; and adding also three others, which are now, however, included in *Hippeastrum*. It would not be a matter for regret if *Amaryllis*, now limited to a single species, which occurs only in Cape Colony and the Canary Isles, were to disappear from the list of generic names, in favour of Link's more clearly defined genus *Callicore*. With the disappearance of *Amaryllis* there would be no advantage in retaining the derivative names of "Amaryllidaceæ" and "Amaryllideæ"; and the ordinal and tribal names of "Hypoxidaceæ" and "Hypoxideæ," used by Lindley and by Robert Brown respectively for the same group of genera, if applied with a wider significance, would be more appropriate, as being based on a genus which is represented by species which range from South Africa and Tropical Africa, across South Asia, and the whole of the Australasian continent, to North America. The tribe of *Hypoxideæ* has at various times by competent authorities been included in *Liliaceæ*, *Iridaceæ*, and *Hæmodoraceæ*, and the name, used in the ordinal sense with this wider significance, would thus serve to emphasize phylogenetic affinities, which are not sufficiently implied in the use of the other ordinal name.†

In his *Synopsis of Hypoxidaceæ*,‡ Mr. J. G. Baker includes four genera. Of these four genera, *Pauridia* has since been shown to belong to *Hæmodoraceæ*, and *Molineria* may best be considered a subgenus of *Curculigo*, if we do not accord generic importance to the occasionally beaked ovary, but rather to the character of the fruit being an indehiscent berry instead of a circumscissile dehiscent capsule. To these two genera, which comprise the tribe of *Hypoxideæ*, I propose to add a third, by reviving Salisbury's genus *Ianthe* for the glabrous species included in *Hypoxis*. This splitting has already been indicated by Mr. Baker in his *Synopsis*, by grouping the species of *Hypoxis* in two subgenera, *Ianthe* and *Eu-hypoxis*. In the former are sunk *Fabricia* Thunb. (in part), *Ianthe* Salisb., *Spiloxene*, Salisb.; in the latter are sunk *Niobea* Willd., *Franquevillea* Zoll., *Platyzyga* Lallem.

---

* *Handbuch z. Erkennung d. Gewächse*, i. p. 193 (1829).

† See also Caruel in *N. Giorn. Bot. Ital.* x. p. 94 (1878).

‡ *Journ. Linn. Soc.* xvii. (1878).

The presence or absence of pubescence in a group of species is not in itself, of course, a distinctive generic character; but an examination of the available material certainly shows that the other characters adduced are constant in many series of specimens. Unfortunately the glabrous species of *Hypoxis* are not showy plants, and no living specimens are available for dissection. There are none under cultivation either in the bulb-pits or in the ranges in Kew Gardens. Several of the hairy species are, however, under cultivation; and the examination of herbarium-specimens shows the constant differences in floral structure exhibited by the two groups. Mr. R. Schlechter has recently pointed out* that geographically as well as ecologically in South Africa the distribution of the entirely glabrous and of the hairy species respectively is interesting. The former occur in south-west Namaqua-land and the higher western region of Cape Colony, but fail altogether in the eastern region, and collectively are shade-plants, occurring generally at lower elevations, and even near the sea-level, in contrast to the higher range attained by the hairy species.

The characters adduced by Salisbury for the separation of *Ianthe*, *Spiloxene*, and *Hypoxis*, though not borne out in the examination of a series of specimens, sufficiently indicate his critical acumen in the examination of plants, and the soundness of his views as to the fundamental characters which should serve for the separation of genera. The following remarks are transcribed from Salisbury's *Liriogamæ*, a book not readily obtainable, in the section relating to *Hypoxideæ*:—"*Ianthe* has an annual bulb, dilated at the base into a jagged margin like that of *Hesperanthus*; its leaves are attenuated, in one species striped with white down the middle; pericarpium unilocular from the earliest period; internal surface of petals yellow without a large spot at their base; filaments inserted on the receptacular disc as close as possible to the style, and perfectly distinct from the petals; rachis of anthers confluent with the filament; stigmata united; and its seeds are inserted by comparatively long funiculi all over the surface of three very large bolstered parietal placentas. *Spiloxene*, so named from the dark spot at the base of its petals, agrees with *Ianthe* in its root, but has longer and more attenuated leaves, more or less scarious and crenulated at the edge; its flowers are very large, solitary, and seldom in more than one or two of the inner axils; peduncle fistular, with a long sheathing foliaceous bract towards the bottom; pericarpium trilocular, but as it ripens the partitions, which are very thin, nearly vanish, and the centre of the placentas becomes hollow; petals only expanded during sunshine; filaments inserted in two series on the disc of the pericarpium, and nearer to the style than to the petals; midrib of anthers an uninterrupted continuation of the filament; stigmata united nearly up to the top; and seeds inserted in many rows. Lastly, to *Hypoxis* I only refer those species which agree with Linné's type, *erecta*, in having perennial roots full of yellow or orange-coloured juice; leaves continuing to vegetate nearly through the whole year, and never decaying all at the same time, trifarious, generally pubescent, sharply keeled, not unlike those of *Carex;* slender tough angulated solid peduncles; panicled or solitary flowers, the two lowest generally opposite; a small bract at the base of each pedicel; petals of one yellow colour internally; filaments inserted conjointly in the marginal disc of the pericarpium and base of the petals; anthers 'pivotantes' or nearly so, as the French well express this sort of insertion, their midrib far broader than the top of the filaments, not confluent; seeds only in two series on narrow placentas." In the series of specimens I have examined, among the species referred by Salisbury to *Ianthe* and *Spiloxene*, the basifix anthers and free stigmas seem to be constant, while in the hairy species of *Hypoxis* the anthers are uniformly medifix and versatile (though not so freely movable as in *Lilium*), and sagittate at the base, and the stigmas united. The constancy of these two important floral characters, the basifix anthers and free stigmas, justifies, I think, the separation of the entirely glabrous species from the hairy species; the former to be included in the revived genus *Ianthe*, which in an amended form is here defined.

---

* Engler's *Jahrbuch*, xxvii. p. 88 (1899).

IANTHE.

Perigonii tubus supra ovarium haud productus; segmenta subæqualia persistentia patentia, interiora oblonga, exteriora lanceolata dorso viridula. Stamina perigonii basi inserta; filamenta erecta subulata; antheræ introrsæ basifixæ lineari-oblongæ. Ovarium erostre, clavatum vel subgloboso-turbinatum; stigmata discreta libera lanceolato-sagittata erecta; ovulæ in loculo 4–20; stylus brevis subulatus. Capsula clavata vel subgloboso-turbinata, membranacea, infra apicem circumscissa operculata, evalvis vel loculicide trivalvis, septis sæpe evanidis. Semina minuta globosa curvato-funiculata, lateraliter plusminus rostello biappendiculata; testa crustacea lucida atro-castanea. Embryo albumine laxe carnoso interdum fere farinaceo inclusus.—Herbæ acaulescentes omnino glabræ. Folia graminoidea persistentia, haud plicata; omnia basilaria, cormo monocarpico prodeuntia. Pedunculi terminales, tametsi simulate axillares. Flores solitarii, rarius in umbellam laxam dispositi, lutei vel albidi.

Syn.: *Fabricia* Thunb. (p. m. p.) in Fabric. *Reise nach Norw.* p. 23 (1779).
Ianthe Salisb. *Gen. Plant. fragm.* p. 44 (1866).
Spiloxene Salisb. ,, ,, ,,
Hypoxis subgen. *Ianthe* Baker in *Journ. Linn. Soc.* xvii. p. 99 (1878).
Hypoxis sect. *Ianthe* Pax in Engl. & Prantl, *Natürl. Pflanzenf.* ii. abt. v. p. 121 (1887); Durand, *Ind. Gen. Phanerog.* p. 415 (1888).

Geogr. area.—Most of the species are found in Cape Colony, a few in Australia and Tasmania, and one in New Zealand.

Provisional List of Species.

1. I. alba *Salisb.*; = *Fabricia alba* Thunb. in Fabric. *Reise nach Norw.* p. 26 (1779).
2. I. aquatica; = *Hypoxis aquatica* Linn. f. *Suppl. Plant.* p. 197 (1781).
3. I. curculigoides; = *Hypoxis curculigoides* Bolus, in Hook. f. *Ic. Plant.* t. 2259 a (1893), non Wall. *List* (1828).
4. I. glabella; = *Hypoxis glabella* R. Br. *Prodr.* i. p. 289 (1810).
5. I. gracilipes; = *Hypoxis gracilipes* Schlechter, in Engl. *Jahrb.* xxvii. p. 88 (1899).
6. I. leptantha; = *Hypoxis leptantha* Benth. *Fl. Austral.* vi. p. 451 (1873).
7. I. linearis *Salisb.*; = *Hypoxis linearis* Kennedy, in Andr. *Bot. Reposit.* t. 171 (Aug. 1801).
8. I. Maximiliani; = *Hypoxis Maximiliani* Schlechter, in Engl. *Jahrb.* xxvii. p. 89 (1899).
9. I. minuta; = *Helonias minuta* Linn. *Mant. Plant.* ii. p. 225 (Oct. 1771).
10. I. monophylla; = *Hypoxis monophylla* Schlechter, in Engl. *Jahrb.* xxiv. p. 453 (1897).
11. I. occidentalis; = *Hypoxis occidentalis* Benth. *Fl. Austral.* vi. p. 451 (1873).
12. I. ovata *Salisb.*; = *Hypoxis ovata* Linn. f. *Suppl. Plant.* p. 197 (1781).
13. I. pusilla; = *Hypoxis pusilla* Hook. f. *Fl. Tasman.* ii. p. 86, t. 130 b (1860), non H. B. et K. *Nov. Gen. et Sp.* (1815).
14. I. Schlechteri; = *Hypoxis Schlechteri* Bolus, in Hook. f. *Ic. Plant.* t. 2259 b (1893).
15. I. serrata *Salisb.*; = *Fabricia serrata* Thunb. in Fabric. *Reise nach Norw.* p. 29 (1779).
16. I. stellata; = *Amaryllis capensis* Linn. *Sp. Plant.* ed. 2, p. 420 (1762), excl. syn.; *Hypoxis stellata* Linn. herb., et Linn. f. *Suppl. Plant.* p. 197; *Spiloxene stellata* Salisb. *Gen. Plant. fragm.* p. 44.
17. I. umbraticola; = *Hypoxis umbraticola* Schlechter, in Engl. *Jahrb.* xxvii. p. 89 (1899).

Clavis analytica.

1. Scapus foliis brevior. Flores 1–3 in pedunculo, rarius umbellati.
* Stamina æquilonga.
¶ Flores umbellati.
I. aquatica (2).
¶ ¶ Flores 1–3 in pedunculo.
† Scapus basi bracteatus.
× Perigonium expansum 8 mm. diam.
I. minuta (9).
× × Perigonium expansum 38–50 mm. diam.
I. linearis (7).
† † Scapus infra medium bracteatus.
× Capsula subgloboso-turbinata.
I. ovata, *glabella* (12, 4).
× × Capsula clavata.
° Perigonium expansum 10–20 mm. diam.
I. serrata, *occidentalis* (15, 11).
°° Perigonium expansum 85–90 mm. diam.
I. Maximiliani (8).
* * Stamina inæquilonga ; filamenta 3 longiora, 3 breviora.
× Capsula subgloboso-turbinata.
I. pusilla (13).
× × Capsula clavata.
° Folia plura.
I. leptantha (6).
°° Folia singula.
I. monophylla (10).

2. Scapus foliis longior, interdum æquilongus. Flores in pedunculo solitarii, rarius 2.
* Stamina æquilonga.
† Scapus basi bracteatus.
× Stigmata angusta linearia.
° Cormus longe ovatus.
I. Schlechteri (14).
°° Cormus globosus.
I. alba (1).
× × Stigmata lata oblongo-lanceolata.
I. curculigoides (3).
† † Scapus medio bracteatus.
I. stellata (16).
* * Stamina inæquilonga; filamenta 3 longiora, 3 breviora.
† Perigonii segmenta ovario longiora.
I. gracilipes (5).
† † Perigonii segmenta ovario breviora.
I. umbraticola (17).

Salisbury derives the generic name "Ianthe" from ιαινω (*i.e. læte floreo*), using the words in their Ciceronian sense, and without prejudice to the wayward nymph of that name.

Two other glabrous species of *Hypoxis* have been described by

Mr. J. G. Baker. One, *H. Scullyi*, may, perhaps, be reduced to a variety of *Ianthe aquatica;* the other is *H. Andrewsii*, otherwise *H. obliqua* Andr. (*non* Jacq.). This latter species is founded on the figure of a plant cultivated in a Clapham nursery, and nothing further is known about it. An examination of Andrews' figure shows that the rhizome is a tuber with numerous long root-fibres, and not a corm, such as is characteristic of other species which are referred to *Ianthe*. If, therefore, the species is to be kept up, it should find a place in *Hypoxis* proper until more can be known about it.

No fossil forms or impressions of any of the *Hypoxideæ* have been identified.

The plate which illustrates this paper represents a specimen of *Ianthe stellata*, and is reproduced by photography from a sheet in the Linnean Herbarium to which a single specimen is attached, and at the bottom of which is written the single word 'stellata' in Linné's handwriting.

MOSSES OF WEST LANCASHIRE.

By J. A. Wheldon, F.L.S., and Albert Wilson, F.L.S.

This list, which is supplementary to our article on the "Mosses of West Lancashire" (*Journ. Bot.* Nov. and Dec. 1899), contains numerous plants which are new not only to vice-county 60, but also to the Mersey Province. These latter are indicated by having an asterisk prefixed. The few species included in the following pages which were also recorded in our first list are marked by an obelisk sign, and are introduced here, either because their rarity in the county renders the discovery of a new locality interesting, or because we wish to modify statements as to their rarity given in the list named. All the remaining species have been found or determined since our original list was written.

The foregoing remarks are not intended to apply to the *Sphagna*. Many of these appeared in the paper quoted under other names. The publication of Mr. Horrell's work on the European *Sphagnaceæ* called for a revision of these, and that we have so soon been able to allot them names under the Warnstorfian system is entirely due to the great help given us by Mr. Horrell, who has spared neither time nor trouble in confirming, correcting, or naming our gatherings. We have not quoted all the localities we possess for each species, but sufficient to indicate the richness of the Lancashire fells in these plants. Some bryologists look askance at the new system of Sphagnology. Whatever faults it has, it certainly has the merit of finding names for, and enabling us to quote, well-marked and commonly occurring forms which could not be satisfactorily referred anywhere under the older arrangement.

We have received numerous lists and specimens from Mr. H.

Beesley, of Preston, mostly confirmed by Dr. Braithwaite or Mr. Bagnall. These are indicated by the capital *B*. As in our first list, the abbreviations *Wh.* and *Wi.* stand for Wheldon and Wilson respectively; and where no authority is quoted, the specimens were found by the authors jointly. The figures 1, 2, 3 refer to our north, east, and west divisions, as defined in this Journal for Nov. 1899, pp. 465 and 466.

We have again to record our indebtedness to Messrs. J. E. Bagnall, H. N. Dixon, S. M. Macvicar, and Mons. F. Renauld for much help, and to express our thanks for their unfailing kindness and courtesy.

Sphagnum fimbriatum Wils. var. *tenue* Grav. 3. Cockerham Moss.—f. *compacta*. Cockerham Moss.—**S. Russowii* Warnst. var. *virescens* Russ. 2. Caton Moor, Sept. 1900.—**S. Warnstorfii* Russ. var. *versicolor* Russ. 2. Marshaw Fell, Wyresdale, June, 1900, *Wi.* —*S. rubellum* Wils. var. *rubrum* Grav. 2. Wolfhole Crag and moor above Gavells Clough, *Wi.* Clougha, *Wh.* Roeburndale and Udale. — f. *robusta*. Upper Roeburndale. — Var. *purpurascens* Warnst. 2. Windy Clough, *Wh.* Black side of Tarnbrook Fell, *Wi.*—Var. *versicolor* Russ. 2. Black side of Tarnbrook Fell. 3. Cockerham Moss. 1. Greygarth Fell. — Var. *pallescens* Warnst. Cockerham Moss. — *S. acutifolium* Russ. & Warnst. Apparently rarer with us than either *S. rubellum* or *S. subnitens*.—Var. *griseum* Warnst. 2. Longridge Fell, *Wh.* Lythe Fell and Upper Grizedale, *Wi.* — Var. *pallido-glaucescens* Warnst. 2. Harris End Fell, *Wi.*—Var. *pallescens* Warnst. 2. Mallowdale Fell. Clougha, *Wh.* Whitmoor (f. *robusta* subf. *dasyclada*). — Var. *versicolor* Warnst. f. *robusta*. 2. Tarnbrook Fell, *Wi.* — Var. *flavo-rubellum* Warnst. Mallowdale Fell. — Var. *viride* Warnst. 2. Longridge Fell, *Wh.* White Moss, Roeburndale, *Wi.* Scorton, *B.*—f. *gracilis*. 2. White side of Tarnbrook Fell, *Wi.*—f. *ano-orthoclada*. 2. Windy Clough, *Wh.* Gavells Clough, *Wi.* — Var. *rubrum* Warnst. 2. Clougha, *Wh.* Whitmoor, Lower Salter, *Wi.* — **S. quinquefarium* Warnst. var. *viride* W. 2. Clougha, *Wh.* — *S. subnitens* R. & W. Common on the fells.—Var. *flavo-rubellum* Warnst. 2. Longridge and Fairsnape Fell, *Wh.* Bleasdale Fell, Fairsnape Clough, Upper Grizedale, and Calder Valley, *Wi.* 1. Whittington Moor, *Wi.* — Var. *versicolor* Warnst. 2. Upper Grizedale, Admarsh, and Lythe Fell, *Wi.* 1. Whittington Moor and Ireby Fell, *Wi.* — Var. *griseum* Warnst. 1. Upper Ease Gill, *Wi.* — Var. *violascens* Warnst. 2. Longridge Fell, *Wh.* Upper Roeburndale, Calder Valley, Blaze Moss, and Trough of Bowland, *Wi.* Tarnbrook Fell.—Var. *virescens* Warnst. 2. Fairsnape Clough, *Wi.* — Var. *obscurum* Warnst. 2. Wardstone. Upper Grizedale and Blaze Moss, *Wi.* — Var. *flavescens* Warnst. 1. Gressingham Moor, *Wi.* — Var. *pallescens* Warnst. Upper Grizedale, *Wi.*—*S. squarrosum* Pers. var. *spectabile* Russ. 2. Dolphinholme, *Wh.* Barnacre, near Garstang, *Wi.* Mallowdale Fell and Greenbank Fell. — Var. *subsquarrosum* Russ. 2. Calder Valley, near Garstang, *Wi.* Mallowdale Fell. — *S. teres* Angstr. var. *squarrosulum* Warnst. 3. Cockerham Moss. — *S.*

cuspidatum R. & W. Common on the fells and mosses. — Var. *falcatum* Russ. 2. Upper Grizedale, Lower Bleasdale, and Lythe Fell, *Wi.* Longridge Fell, *Wh.*—Var. *submersum* Schimp. Common on all the fells. — Var. *plumosum* Nees & Hornsch. Cockerham Moss, *Wh. & Wi.* Near Scorton, *B.* — *S. trinitense* C. Mull. 3. Cockerham Moss. 2. Longridge Fell, *Wh.* Lower Bleasdale, *Wi.* —*S. pulchrum* Warnst. 2. Upper Roeburndale, *Wi.* 3. Cockerham Moss. — **S. obtusum* Warnst. 3. Cockerham Moss, June, 1900. — *S. recurvum* R. & W. Very common on the fells and mosses. — Var. *mucronatum* Warnst. 3. Cockerham Moss, June, 1900. 2. Longridge Fell, *Wh.* Harris End Fell and Whitmoor, *Wi.* Wardstone.—Var. *amblyphyllum* Warnst. Longridge Fell, *B.* — *S. molluscum* Bruch. 1. Easegill. 2. Whitmoor, *Wi.* Tarnbrook Fell. — f. *compacta* Warnst. Cockerham Moss. — *S. compactum* DC. Frequent on the drier fells. — Var. *imbricatum* Warnst. 2. Longridge Fell, *Wh.* Whitmoor and Tarnbrook Fell, *Wi.* White Moss, Hindburn. — Var. *subsquarrosum* Warnst. 2. Longridge Fell, *Wh.* Whitmoor, *Wi.* White Moss, Hindburn. 1. Gressingham and Arkholme Moor, *Wi.* — *S. subsecundum* Limpr. 2. Longridge, *B.* — **S. inundatum* Warnst. 1. Lords Lot Wood, Arkholme, *Wi.* 2. Longridge, *B.*—*S. rufescens* Warnst. Common on the fells and mosses. 1. Whittington Moor, *Wi.* 2. Longridge Fell, *Wh.* Lower Bleasdale, *Wi.* Tarnbrook Fell. — **S. aquatile* Warnst. 2. Longridge Fell, *Wh.* Whitmoor. — **S. crassicladum* Warnst. Rather frequent. 2. Slope of Fairsnape Fell towards Chipping, Clougha, and Ellel, *Wh.* Harris End Fell, *Wi.* Udale. — **S. medium* Limpr. var. *roseum* Warnst. 2. Tatham Moor, *Wi.* White Moss, Hindburn, Upper Roeburndale, and Tarnbrook Fell. —Var. *roseo-pallescens* Warnst. 2. Wolfhole Crag, *Wi.* 3. Cockerham Moss.—*S. cymbifolium* Warnst. Not nearly as frequent as the next. — Var. *glaucescens* Warnst. 1. Lords Lot Wood, *Wi.* 2. Wardstone, *Wh. & Wi.* Scorton, *B.* — *S. papillosum* Lindb. var. *normale.* Common on the fells, as also f. *conferta.* — Var. *sublæve* Limpr. Frequent on the fells, and sometimes attaining an enormous size. — **S. turfaceum* Warnst. 2. Longridge Fell and Clougha, *Wh.* 3. Cockerham Moss. 1. Arkholme Moor, *Wi.*

Andreæa Rothii W. & M. 2. Upper Roeburndale, Oct. 1899. Whiteray Gill, Hindburn; North side of Harris End Fell, and Tarnbrook Fell, *Wi.* — Var. *falcata* Lindb. 2. Catshaw Greave, April, 1900, *Wi.* Hawthornthwaite Greave.—*A. crassinervia* Bruch. 2. Upper Roeburndale, Oct. 1899.

†*Tetraphis Browniana* Grev. 2. Grit rocks by a waterfall near Botton, Hindburn, Oct. 1899, *Wh. & Wi.* By two falls in Whiteray Gill, two and a half miles from the above, *Wi.*

†*Oligotrichum incurvum*, Lindb. 2. This proves to be frequent, even abundant in several localities at the head of Wyresdale, *Wi.*; also in Hindburn, Roeburndale, &c.

†*Catharinea crispa* James. 2. Since recording this we have found it abundantly by most of the dale streams—*e.g.* Hindburn, Roeburndale, Foxdale, Udale, Tarnbrook Wyresdale, Marshaw Wyresdale, Grizedale, and Hodder Valley.

Polytrichum aloides Hedw. var. *Dicksoni* Wallm. 2. By the Lune between Lancaster and Caton, sparingly, May, 1900, *Wh*.—*P. nanum* Neck. 1. Gatebarrow Woods, near Silverdale, *Wi*.

Pleuridium axillare Lindb. 2. On the mud of a recently-drained mill dam, Calder Vale, Dec. 26th, 1900.—†*P. alternifolium* Raben. 3. Cottam, *B*.

Brachyodus trichodes Fürnr. 2. Gully west of Dale Beck, Greenbank Fell, Hindburn, Oct. 1899.

Dicranella rufescens Schimp. 2. Over Salter, Roeburndale, Oct. 1898; and Tatham Beck, Hindburn, *Wi*. Greenbank Fell and Caton Moor.

Blindia acuta B. & S. 2. Gavells Clough, Wyresdale, June, 1900, *Wi*.

**Campylopus atrovirens* De Not. 2. Clougha Scar, Oct. 1899, *Wh*. Slope of Wardstone towards Tarnbrook Fell at 1300 feet, June, 1900. In both localities on Millstone Grit. — **C. flexuosus* Brid. var. *zonatus* Milde (= var. *majus* Boul.). White side of Tarnbrook Fell, June, 1900, *Wi*. We are indebted to Mr. Dixon for the determination of this fine and distinct looking variety.

Dicranodontium longirostre B. & S. 2. Deep shaded hollows amongst grit rocks on Hell Crag, Tarnbrook Fell, Sept. 1900.—†Var. *alpinus* Schimp. 1. A second locality for this has been found, *viz*. Greygarth Fell, at 1900 feet, Aug. 1899, *Wi*.

**Dicranum scoparium* Hedw. var. *paludosum* Schimp. 1. Whittington Moor, *Wi*.

Fissidens viridulus Wahl. var. *Lylei* Wils. 3. Near Garstang, Jan. 1900, *Wi*.—*F. exilis* Hedw. 3. Lea, *B*.

Grimmia Doniana Smith. 1. Greygarth Fell, near summit, July, 1899, *Wi*.

**Rhacomitrium protensum* Braun. 2. A small form of this occurs on rocks by the Wyre near Dolphinholme, May, 1900, *Wh*.

Pottia intermedia Fürnr. 3. Between Lytham and St. Annes, Jan. 1900, *Wh*. 1. Near Middleton and Overton, *Wi*. Silverdale and Carnforth, *Wh*. — †*P. recta* Mitt. 1. Near Carnforth and Silverdale, *Wh*. Henridden and Yealand, *Wi*.—*P. lanceolata* C. M. Several places near Silverdale, Feb. 1901, *Wi*.

Barbula Hornschuchiana Schultz. 3. Southshore, near Blackpool, March, 1898, *Wh*. 1. Thrang End, *Wi*.

**Pleurochæte squarrosa* Lindb. 3. Limestone rocks near Silverdale, Oct. 1900, *Wh*.

†*Orthotrichum Lyellii* Hook. & Tayl. 1. Not unfrequent on trees in the neighbourhood of Whittington, Melling, and Cantsfield, *Wi*. —**O. leiocarpum* B. & S. 1. On elders, Silverdale, Feb. 1901, *Wi*. —*O. tenellum* Bruch. 2. In small quantity near Garstang, Dec. 1901, *Wi*. (*teste* Dixon).

†*Tetraplodon mnioides* B. & S. Clougha, *Wh*.

Splachnum sphæricum Linn. f. 2. Wardstone, at 1600 feet, June, 1900.

Physcomitrium pyriforme Brid. Catforth and Ashton, 1900, *B*.

Discelium nudum Brid. 2. Tatham Beck, Hindburn, Sept.

1899, abundant, *Wi.* Caton Moor and near Tarnbrook; with fruit in each locality.

†*Amblyodon dealbatus* P. Beauv. 2. Moor near Gavells Clough, on the white side of Tarnbrook Fell, *Wi.*

Aulacomnium androgynum Schwaeg. 3. Lea, 1900, *B.*

†*Webera elongata* Schwaeg. 2. Near Garstang, *B.* (*teste* Dr. Braithwaite).

†*Leucodon sciuroides* Schwaeg. 1. On a wall near Ireby, *Wi.* Trees near Borwick, *Wi.* 3. Weeton, near Blackpool, very fine, *B.*

Heterocladium heteropterum B. & S. 2. Waterfall near Bolton, Hindburn, Oct. 1899. Clougha, *Wh.*

**Cylindrothecium concinnum* Schimp. 1. Amongst *Thuidium recognitum*, Silverdale, April, 1900, *Wh.* Roadside south-west of Dalton Crag, very fine, *Wi.*

**Brachythecium velutinum* B. & S. var. *intricatum* Hedw. 3. Catforth, *B.* (*teste* Dr. Braithwaite). — *Var. *prælongum* B. & S. 3. Lytham, *B.* (*teste* Dr. Braithwaite). — *B. salebrosum* B. & S. 3. Ashton, near Preston, 1900, *B.*

Eurynchium rusciforme* Milde var. *atlanticum* Brid. 2. Near Botton, Hindburn, Oct. 1899.—E. abbreviatum* Schimp. 1. Rocky wood near Silverdale, Oct. 1900, *Wh.* — *E. tenellum* Milde. 1. Silverdale, in several localities, *Wh.* Scorton, *B.*

**Plagiothecium denticulatum* B. & S. var. *densum* Schimp. 2. Clougha Pike, Oct. 1899, *Wh.*

**Amblystegium Juratzkæ.* 3. By the canal between Galgate and Glasson, Sept. 1900, *Wh.* Lea, *B.*—*A. fluviatile* B. & S. 1. Rocks in the Leighton Beck, *Wi.* — **A. filicinum* De Not. var. *trichodes* Brid. Coast between Silverdale and Ings Point, *Wh.*

†*Hypnum riparium* L. var. *longifolium* Schimp. 2. On rotten wood in a pond at Claughton, near Garstang, March, 1900, *Wi.* — *H. aduncum* Hedw. (group *typicum*) *f. *falcata* Ren. 3. Sandhills near St. Annes, *Wh.*—†f. *gracilescens* Ren. Between Lytham and St. Annes, *Wh.*— *f. *diversifolia*, Ren. St. Annes, *Wh.*— *(Group *Kneiffii*) var. *attenuatum* Boul. (confirmed by Renauld). 3. Near Catterall, very fine and characteristic, *Wi.* — Var. *intermedium* Schimp. 3. Ashton, near Preston, 17 April, 1901, *B.* — †(Group *pseudofluitans*) var. *paternum* Sanio. 3. Ashton, near Preston, April, 1901, *B.* — *H. fluitans* (*amphibium*) *var. *Jeanbernati* Ren. Frequent on the fells. 2. White Moss, Hindburn.—*Forma *Holleri* (Sanio) Ren. A form of the preceding, apparently, found in more exposed places and at higher altitudes. We place it here on Mons. Renauld's advice. 2. Longridge Fell, *Wh.* Tatham Moor, Catshaw Fell, and Hawthornthwaite Fell, *Wi.* Mallowdale Fell, Wardstone, Tarnbrook Fell, and Bleasdale. — *Forma *tenella* Ren. Bleasdale.—*Forma *condensata* Sanio. 2. White Moss, Hindburn. — Var. *elatum* Ren. et Arnell. A form at present doubtful, of which Mons. Renauld writes "*ad var. elatum accedens*," was found by us on Cockerham Moss, June, 1900. — *Var. *gracile* Boul. 2. Longridge Fell, Oct. 1898, *Wh.* Botton Head Fell and Whiteray Fell, *Wi.* 2. Greygarth Fell, *Wi.* 3. Cockerham Moss. — *Var. *Payoti* Ren. 2. Greenbank Fell. — †(Gr. *falcatum*) var. *falcatum*

Schimp. 2. Harris End Fell, Fairsnape Fell, and Lower Bleasdale, *Wi.* — *Var. *ovale* Ren. MS., var. nov. Small, slightly branched, procumbent, of the characteristic colour of the group, alar cells coloured and slightly incrassate. Leaves oval, suddenly contracted to a moderate subule; nerve weak, and often forked. Near summit of Greygarth Fell, at 1800 feet, *Wi.* Found also on Pendle Hill in S. Lancs. — (Gr. *exannulatum*) *var. *pinnatum* Boul. 2. Calder Valley and Bleasdale Fell, *Wi.* Mallowdale Fell and Hindburn. 1. Borwick Swamp and Greygarth Fell, *Wi.*—*Forma *stenophylloides* Ren. MS. Tatham Moor, Hindburn, *Wi.*—*Forma *polyclada* Ren. MS. White Moss, Hindburn, &c. — †Var. *brachydictyon* Ren. 2. White Moss, Hindburn. — (Subgroup *Rotæ*) var. *falcifolium* Ren. 3. St. Annes, *Wh.* 2. Between Greenbank and Dolphinholme, *Wh.* Marshaw, *Wi.*—*Forma *inundata* Ren. Marshaw, *Wi.* — **H. vernicosum* Lindb. var. *majus* Lindb. 1. Bog near Docker, Nov. 1900, *Wi.* — †*H. revolvens* Swartz. The state which Renauld formerly called var. *subauriculatum* occurs with the last at Docker. — *H. ochraceum* Turn. *var. *complanatum* Milde. 2. In the Tatham Beck, Hindburn, Sept. 1899, *Wi.* — Var. *flaccidum* Milde. Hindburn, Oct. 1899. — *H. palustre* Linn. var. *hamulosum* B. & S. 2. Damas Gill, Wyresdale, *Wh.*—*H. scorpioides* Linn. 1. By Leighton Beck, Silverdale, Aug. 1899, and near Docker, *Wi.* 2. Marshaw Fell, Wyresdale, *Wi.* — *H. giganteum* Schimp. 3. Sparingly at St. Annes, Aug. 1899, *Wi.* 1. Bog near Docker, with fruit, *Wi.* — **H. sarmentosum* Wahl. 2. Marshaw Fell, Wyresdale, at only 650 feet! June, 1900, *Wi.*

†*Hylocomium brevirostre* B. & S. 1. Gatebarrow and near Leighton Beck, *Wi.*

†*Frullania fragilifolia* Tayl. 1. Dalton Crag.

Lepidozia Pearsoni Spruce. 2. Apparently frequent on the higher gritstone moorlands. Longridge Fell, Feb. 1899, and Clougha, *Wh.* Mallowdale Fell, Hell Crag, Haylot Fell and Udale.

Kantia Sprengellii Mast. 2. Longridge, 1896, c. frt., *Wh.* Upper Grizedale, *Wi.* Udale. Railway cutting near Garstang, *Wi.*

†*Cephalozia Lammersiana* Huben. 2. Upper Grizedale, *Wi.*— †*C. sphagni* Dicks. 2. White Moss, Hindburn. 3. Cockerham Moss.

Scapania resupinata (Nees). 2. Clougha, *Wh.* Tarnbrook Fell, *Wi.* — Var. *minor* Pears. 2. Long Crag, above Tarnbrook Fell, and Whiteray Fell, Hindburn, *Wi.* Clougha, *Wh.*—*S. nemorosa* (L.) 1. Warton, April, 1899, *Wi.* 2. Upper Grizedale, *Wi.*

Lophocolea cuspidata Limpr. 2. Leagram Hall, *Wh.*

†*Mylia anomala* Hook. White Moss, Hindburn.

Nardia compressa Hook. 2. Longridge Fell, July, 1898, *Wh.* By the Roeburn below Wolfhole Crag, and on Haylot Fell.

Blasia pusilla (Linn.). 2. Caton Moor, Sept. 1900.

Ricciella fluitans Linn. 2. Between Whittingham Asylum and Longridge, July, 1900, *Wh.*

SOME RECENT ADDITIONS TO THE BRITISH MUSEUM ACANTHACEÆ.

By Spencer Le M. Moore, F.L.S.

The following list contains determinations of African *Acanthaceæ* recently received at the Museum, as well as of some which, by accident, were not seen by Mr. C. B. Clarke while working at his two monographs which deal with the Order as represented in Tropical and South Africa.

Thunbergia affinis S. Moore. Machakos; *Dr. S. L. Hinde.*

T. alata Bojer var. minor (var. nov.).

Folia parva, nequaquam ultra 2·5 cm. long., modica 1·5 cm. long., margine dentata; petioli plerumque 1·5–2·0 cm. long., angustissime alata. Bracteolæ modo 1·3 cm. long. Corollæ tubus nec ultra 1·5 cm. long.

Hab. Tropical East Africa; *Rev. W. E. Taylor.*

According to the single specimen seen, a lowly twiner, about half a metre in height.

Thunbergia (§ Euthunbergia) **Elliotii**, sp. nov. Verisimiliter scandens caule gracili folioso sparsim ramoso appresse hirsutulo, foliis parvis ovatis obtusis basi latis integris nonnunquam leviter undulatis petiolis brevibus alatis fultis utrinque præsertim vero subtus hirsutulis, pedunculis solitariis folia subæquantibus hirsutulis, bracteolis ovato-oblongis breviter acuminatis hirsutis, calycis 12-lobi lobis anguste lineari-lanceolatis tubum subæquantibus glanduloso-pubescentibus, corollæ tubo parum amplificato bracteis subæquilongo, antheris sursum mucronatis staminum posticorum unicalcaratis anticorum bicalcaratis marginibus fere omnino calvis, stigmatis bilabiati labiis subæquimagnis, capsula ——.

Hab. British East Africa, Nandi, 7–8000 feet; *G. F. Scott Elliot*, No. 6969.

Foliorum lamina 2·0–2·5 cm. long., 1·5–2·0 cm. lat., in sicco minutissime bullulata; petioli 0·3–0·5 cm. long. Pedunculi circa 2·0 cm. long. Bracteolæ usque ad 2·0 cm. long., 5-nervosæ, intus puberulæ. Calycis tubus 0·2 cm., lobi 0·25 cm. long. Corollæ tubus basi 0·3 cm. sub limbo 0·55 cm. diam.; limbus circa 2·0 cm. diam., ejus lobi obovati. Antheræ loculi circa 0·3 cm. long. Ovarium 0·2 cm.; stylus vix 1·0 cm. long.

Near *T. laborans* Burkill, but differing from it in the broad petiolate leaves, acuminate bracteoles, narrower corolla-tube, longer glandular teeth to the flowering calyx, &c.

Brillantaisia pubescens T. And. Between Zanzibar and Uyui; *Rev. W. E. Taylor.*

B. madagascariensis T. And. Tropical East Africa; *Rev. W. E. Taylor.*

Ruellia patula Jacq. Somaliland, Mio, 4750 feet; *Lord Delamere.*

Mellera submutica C. B. Cl. Nyassaland, 1895; *Buchanan.*

Mimulopsis runssorica Lindau. Tanganyika; *G. F. Scott Elliot*, No. 8354.

Whitfieldia Stuhlmanni C. B. Cl. Rabai, Mombasa; *Rev. W. E. Taylor.*

Dyschoriste radicans T. And. Somaliland, Gof and Ellámo; *Lord Delamere.*

Micranthus longifolia Lindau. Tropical East Africa; *Rev. W. E. Taylor.*

Acanthus eminens C. B. Cl. Kikuyu; *F. J. Jackson.*

Pseudoblepharis Boivini Baill. Giryama and Tsimba Mountains; *Rev. W. E. Taylor.*

Blepharis extenuata, sp. nov. Suffrutex parvus ramosus glaber, ramis patulis parum angulatis, foliis sessilibus lineari-oblanceolatis apice breviter spinulosis marginibus 2–3-spinuloso-serratis subcoriaceis paribus juxtapositis subæqualibus, ramulis floriferis abbreviatis solitariis vel paucis (usque ad 4) aggregatis, foliis floralibus anguste linearibus longe patenterque spinoso-pinnatifidis spinis utrinque 2–3, bractea parva rigida triangulari-deltoidea sursum serrulata quam bracteolæ breviore, bracteolis subulatis debiliter spinuloso-acuminatis a calyce superatis, calycis rigidi minutissime pubescentis lobo postico integro vel breviter trifido lobum anticum excedente, corollæ minutissime pubescentis labio 5-lobo, capsula ——.

Hab. Namaqualand; *W. C. Scully*, No. 243.

Caulis usque ad 0·3 cm. diam., pallida. Ramuli brunneo-rubescentes, cortice subnitenti laxe obducti, circa 0·2 cm. diam. Folia 1·5–2·0 cm. long., vix 0·3 cm. lat. Folia floralia usque ad 3·5 cm. long., deorsum carinata et 0·2 cm. lat.; harum spinæ patentes, 0·5–0·8 cm. long., rigidæ. Bracteæ 0·3 cm. bracteolæque 0·6 cm. long. Calycis lobus anticus ovato-oblongus, 4-dentatus, 0·7 cm. long.; dentes intermedii laterales excedentes; lobus posticus panduriformis, 1·5 cm. long.; lobi laterales ovati, acuminati, 0·6 cm. long. Flores verisimiliter lutescentes. Corolla tota 1·8 cm. long.; tubus 0·35 cm. long.; labium sursum 0·6 cm. lat., hujus lobi exteriores brevissimi, lobi intermedii fere semicirculares, 0·35 cm. lat., lobus centralis late obcordatus, 0·24 cm. lat. Antheræ 0·3 cm. long.

Apparently nearest *B. Noli-me-tangere* S. Moore, this can easily be distinguished by its narrow leaves, slender floral leaves set with long and thin spines, the bract much shorter than the bracteoles, &c.

Blepharis Scullyi, sp. nov. Acaulis, radice elongato valido sparsissime fibrillifero, foliis sessilibus oblanceolatis apice crebroque marginibus spinescentibus hirsutulis membranaceis, ramulis floriferis elongatis attenuatis multifloris, bracteis imbricatis late oblongo-obovatis sursum 5-lobis pubescentibus lobis 3 intermediis longioribus utrinque semel vel bis spinulosis lobis omnibus apice eleganter spinosis, bracteolis subulatis pubescentibus quam bracteæ manifeste brevioribus, calycis ampli pubescentis lobo postico quam anticus paullo majore, corollæ labio 5-lobo, capsula 1-sperma.

Hab. Namaqualand; *W. C. Scully*, No. 249.

Radix fere 20·0 cm. long., rectus, sursum 0·3 cm. diam. Folia circa 5·0 cm. long. et 1·0 cm. lat., serraturæ spinulosæ usque ad

0·5 cm. long. Ramuli floriferi usque 10·0 cm. long., circa 1·5 cm. lat. Bractea in sicco substraminea paullo ultra 2·0 cm. long., 1·0 cm. lat., concava; lobi intermedii triangulares, 0·8 cm. long.; lobi externi 0·15 cm. long. Bracteolæ 0·8 cm. long. Calycis lobus posticus ovatus apice breviter spinosus, 1·5 cm. long., basi 0·9 cm. lat.; lobus anticus brevissime bidentatus 1·3 cm. long., basi 0·6 cm. lat.; lobi laterales 0·8 cm. long. Corolla tota vix 2·5 cm. long.; tubus 0·7 cm. long., deorsum dilatatus sursum cylindricus, pars cylindrica 0·4 cm. long., pubescens; labium sursum 0·85 cm. lat.; hujus lobi externi ovati, obtusissimi, 0·15 cm. long.; lobi intermedii circa 0·3 cm. long.; lobus centralis obcordatus, 0·33 cm. long. Antheræ 0·32 cm. long. Capsula 1·0 cm. long., 0·4 cm. lat. Semen humectatum circa 0·5 cm. lat.

Lepidagathis scariosa Nees. Gof; *Lord Delamere.*

L. Andersoniana Lindau. Nyassaland, 1895; *Buchanan*, No. 228.

Crabbea velutina S. Moore. Somaliland, between Lé and Tocha; *Lord Delamere.*

Crossandra pungens Lindau. Rabai, Mombasa and Giryama and Tsimba Mountains; *Rev. W. E. Taylor.*

C. spinosa Beck. Mio, 4750 feet; *Lord Delamere.*

C. mucronata Lindau. Giryama and Tsimba Mountains; *Rev. W. E. Taylor.*

[Obs.—*C. puberula* Klotzsch var. ? *Smithii* C. B. Clarke in Flora of Trop. Africa, v. p. 117. The type of this variety—it is in the British Museum—is manifestly not in any way related to *C. puberula* Klotzsch. To me it seems to be merely *C. nilotica* Oliv. var. *acuminata* Lindau.]

Barleria eranthemoides R. Br. Somaliland, Jara; *Dr. Donaldson Smith.* Between Cantalla and Hadda, and between Lé and Tocha; *Lord Delamere.*

B. irritans Nees. Cape Colony, between Graaf Reinet and Zuurberg Mountains; *Rev. H. C. Day.* Without locality; *Mrs. Clarke.*

B. setigera Rendle, var. ? *brevispina* C. B. Cl. East Tropical Africa; *Rev. W. E. Taylor.*

B. spinulosa Klotzsch. Nyassaland; *Buchanan*, 1895, No. 224.

B. ventricosa Nees. Somaliland, Wagga Mountain; *Mrs. Lort Phillips.*

B. Volkensii Lindau. Rabai Hills, Mombasa; *Rev. W. E. Taylor.* Near Lake Marsabit; *Lord Delamere.*

Neuracanthus gracilior, sp. nov. Caule erecto tereti scabriusculo crebro folioso, foliis lanceolato- vel ovato-oblongis obtusis sessilibus vel subsessilibus basin versus cuneatis undulatis firme membranaceis glabris pag. sup. nitenti necnon cystolithis eminentibus onusta pag. inf. aliquatenus decolori reticulato-nervosa, spicis strobiliformibus sat attenuatis terminalibus vel ex axillis summis ortis, bracteis ovatis spinuloso-acuminatis longe fulvo-ciliatis dorso puberulis et eminenter nervosis, calycis bracteis æquilongi lobis lineari-setaceis acuminatis pilis hispidis dense obsitis anticis quam postici altius connatis, corollæ labio postico 2-lobo lobis late del-

toideis obtusissimis labio antico brevissime 3-lobo, ovarii loculis 2-ovulatis, capsula ——.

Hab. Manongo between the Cunene and Zambesi Rivers; *H. Baum*, No. 852.

Planta circa 30·0 cm. alt. Folia 4·0–6·5 cm. long., inferiora nonnunquam fere 3·0 cm. lat. attingentia, modica vero 1·2–1·5 cm. lat. Spicæ usque ad 7·0 cm. long., vix 1·0 cm. lat. Bracteæ 0·8–0·9 cm. long., juxta medium 0·45 cm. lat.; nervæ longitudinales 9. Calyx 0·9 cm. long.; lobi antici 0·5 cm., postici 0·6 cm. long. Corolla 1·1 cm. long.; limbus 0·6 cm. diam. Ovarium ovoideum, 0·12 cm. long.; stylus 0·3 cm. long., glaber.

Distributed as *Neuracanthus decorus* S. Moore, which, however, has much broader spikes, different bracts, differently shaped calyx-lobes connate higher up and to the same height in the case of both anticous and posticous lobes, &c.

Pseuderanthemum Hildebrandtii Lindau. Rabai Hills, Mombasa and Giryama and Tsimba Mountains; *Rev. W. E. Taylor*.

P. subviscosum (*Eranthemum subviscosum* C. B. Cl.). Nyassaland, 1895; *Buchanan*, No. 118.

Justicia Pseudorungia Lindau. East Tropical Africa; *Rev. W. E. Taylor*.

J. flava Vahl. Gof and Dadáro; *Lord Delamere*. Gof; *Dr. Donaldson Smith*. Mochi, 4–5000 feet; *Rev. W. E. Taylor*.

J. nyassana Lindau. Nyassaland, 1895; *Buchanan*, No. 168.

J. longecalcarata Lindau. Lé and Gof; *Lord Delamere*.

J. dyschoristoides C. B. Cl. East Tropical Africa; *Rev. W. E. Taylor*.

J. Whytei S. Moore. Nyassaland, 1895; *Buchanan*, No. 115.

J. Melampyrum S. Moore. Nyassaland, 1895; *Buchanan*.

J. Phillipsiæ Rendle. Somaliland, Gan Liban; *Dr. Donaldson Smith*.

J. odora Vahl. Lé; *Lord Delamere*.

Justicia (§ CALOPHANOIDES) **Taylorii**, sp. nov. Caule elato geniculato subtetragono patenti-strigoso-villosulo deinde pubescente, foliis longipetiolatis ovatis obtusis nonnunquam breviter cuspidulatis basi rotundato-truncatis pubescentibus mox puberulis in sicco viridibus, glomerulis paucifloris raro brevissime spicatis, foliis floralibus ovatis obtusis bracteas maxime excedentibus ceteroquin foliis similibus nisi multo minoribus, bracteis parvis subulatis quam calyx brevioribus, calycis segmentis subæqualibus linearibus vel anguste lineari-lanceolatis sursum attenuatis corollæ tubo brevioribus hispidulis; corollæ extus pilosæ sursum parum amplificato, limbi labio postico breviter bilobo, antherarum loculo superiore quam inferior breviore, capsula parva oblonga glabra.

Hab. German East Africa ?, Mochi (4000–5500 feet); *Rev. W. E. Taylor*, 1888.

Foliorum pagina 2·5–4·0 cm. long., 1·5–2·0 cm. lat.; petioli 1·0–vix 2·0 cm. long., patenti-villosuli. Folia floralia circa 0·8 cm. long. Bracteæ vix 0·2 cm. long. Flores purpurei. Calyx 0·4 cm. long. Corollæ tubus verisimiliter 0·5 cm. long. Antherarum loc. superior 0·07 cm. long., basi mucronulata, loc. inferior 0·1 cm.

long., calcar 0·05 cm. long. Capsula mucronata, 0·7 cm. long. Semina 0·1 cm. diam., minute tuberculata.

A very distinct species, quite unlike any other of its section. The single specimen serving for the description has several buds, but only one fully-grown corolla, of which the upper part has been destroyed.

Justicia (§ Calophanoides) **Baumii**, sp. nov. Caulibus ascendentibus gracilibus puberulis, foliis parvis brevipetiolatis ovatis utrinque obtusis evanide undulatis glabris glandulis immersis minutis crebro instructis, floribus in axillis superioribus 2–3-nis subsessilibus, bracteis calycem excedentibus oblanceolatis obtusissimis hispidulo-ciliatis, bracteolis imminutis subulatis, calycis segmentis lineari-lanceolatis acuminatis puberulis quam corollæ tubus brevioribus, corollæ extus puberulæ tubo a basi sensim ampliato, limbi labio postico quam anticum breviore bidentato, palato maxime exstante, capsula anguste obovato-oblonga acuta glabra, seminibus quove in loculo 2 suborbicularibus tuberculatis.

Hab. Riuvivi, between the Cunene and Zambesi rivers, at 1200 metres elevation; *H. Baum*, No. 720.

Planta sat humilis ex speciminibus nostros ante oculos nec ultra 12·0 cm. alt. Folia ± 1·0 cm. long, 0·6–0·8 cm. lat., in sicco læte viridia. Bracteæ 0·5 cm., bracteolæ 0·08 cm., calycis segmenta 0·4 cm., corollæ tubus 0·6 cm. long. Corollæ violaceæ labium posticum circa 0·4 cm. long.; anticum vix 0·6 cm. long.; hujus lobi oblongi, obtusi, ægre 0·2 cm. long. Ovarium ovoideum, sursum angustatum, 0·33 cm. long.; stylus deorsum pilosiusculus, 0·35 cm. long. Capsula 0·6 cm. long., 0·3 cm. lat. Semina 0·1 cm. diam., pallide brunnea.

Near *J. Phillipsiæ* Rendle, but easily distinguished by the lowly habit, different bracts and calyx, much narrower lobes of lower lip of corolla, and diverse capsule.

By an obvious oversight this has been distributed as *Justicia monechmoides* S. Moore (*Monechma Welwitschii* C. B. Clarke). As indicated above, it is not a *Monechma*.

Justicia (§ Rostellularia) **Smithii**, sp. nov. Appresse et mox minute strigoso-pubescens, caule ascendente quadrangulari, foliis ovato-oblongis obtusis in petiolum brevem gradatim attenuatis, spicis terminalibus abbreviatis, foliis floralibus anguste lanceolatis acutis quam folia manifeste brevioribus, bracteis linearibus acutis calycem bene excedentibus, calycis segmentis subæqualibus lineari-lanceolatis acuminatis quam tubus corollæ paullo brevioribus, corollæ extus pubescentis tubo a basi parum ampliato, limbi labio postico emarginato quam anticum breviore, antherarum loculis subæqualibus loc. inferiore calcari elongato attenuato curvulo onusto, ovario glabro.

Hab. Hamaro, Somaliland; *Dr. Donaldson Smith*, 1899.

Planta annua, vix spithamea, radice tenui suffulta. Folia 3·0 × 1·0 cm. attingentia, plurima vero circa 1·5 cm. long., et 0·5 cm. lat., firma, in sicco lutescenti-viridia. Folia floralia vix 0·8 cm. et bracteæ 0·6 cm. long., hæ circa 0·05 cm. lat. Flores lutei. Calyx 0·4 cm. long. Corollæ tubus 0·45 cm. long., 0·2–

0·25 cm. lat.; labium anticum 0·55 cm. long., 0·6 lat., lobi obovati, vix 0·2 cm. lat.; labium posticum late ovatum, 0·4 cm. long. Antherarum loculi paullo ultra 0·1 cm. long., loc. inferioris calcar 0·07 cm. long. Ovarium anguste ovoideum, 0·15 cm. long. Stylus deorsum puberulus, 0·5 cm. long. Capsula——

Near *J. aridicola* Rendle, but with several points of difference as respects leaves and flowers. The corollas of *J. Smithii* are much like those of *J. Lorteæ* Rendle, only smaller; here, however, resemblance between the two plants ceases.

Monechma? scabrinerve C. B. Cl. in Fl. Trop. Afr. v. p. 215. Mr. Clarke did not see a flower of this, and hence was led to query the genus. After careful search a flower was found on a specimen at the Museum, and examination of this proves it to be a true *Monechma*.

M. bracteatum Hochst. Somaliland, Wagga Mountain; *Mrs. Lort Phillips*. Ellámo; *Lord Delamere*.

Adhatoda Engleriana C. B. Cl. East Tropical Africa; *Rev. W. E. Taylor*.

Isoglossa strigulosa C. B. Cl. Nyika, Lake Nyassa; *Crawshay*.

I. somalensis Lindau (ex descript.). Ellámo; *Lord Delamere*.

I. Gregorii Lindau. British East Africa, Kikuyu; *F. J. Jackson*.

I. grandiflora C. B. Cl. Nyassaland, 1895; *Buchanan*, Nos. 107, 108. Zambesi River; *Rev. Dr. Stewart*.

Ecbolium Linneanum Kurz. Giryama and Tsimba Mountains; *Rev. W. E. Taylor*.

Hypoëstes Forskalei R. Br. Mau Forest and Kikuyu; *F. J. Jackson*. Somaliland, Wagga Mountain; *Mrs. Lort Phillips*.

H. Hildebrandtii Lindau. Gof and Lé; *Lord Delamere*.

Diapedium Leonotis, O. Kze. Nyassaland, 1895; *Buchanan*, No. 198.

REPORT OF THE BOTANICAL WORK COMMITTEE.

[This Report, more fully entitled "Report to the Lords Commissioners of His Majesty's Treasury of the Departmental Committee on Botanical Work and Collections at the British Museum and at Kew, dated 11th March, 1901," was ordered by the House of Commons to be printed on the 12th of June, and has been issued by the Stationery Office at 2*s*. It is a volume of 218 pages, and contains a vast amount of interesting matter connected with the history of the National Herbarium and of the collections at Kew, some of which we may reproduce later for the benefit of our readers, with such comments as may seem desirable.

On the present occasion we publish an abridgement of the recommendations of the Committee, from which we believe nothing of importance has been omitted, giving the conclusions arrived at and the facts upon which these are based.

The Chairman of the Committee was Sir Michael Foster, K.C.B., M.P.; the other members being "the Right Honourable John, Baron Avebury, P.C., F.R.S., and Frederick DuCane Godman, Esquire, F.R.S., as representing the Trustees of the British Museum; with Stephen Edward Spring Rice, Esquire, C.B.; Horace Alfred Damer Seymour, Esquire, C.B.; Professor Isaac Bayley Balfour, D.Sc., F.R.S., Queen's Botanist for Scotland; Francis Darwin, Esquire, M.B., F.R.S., Reader in Botany in the University of Cambridge; and Sir John Kirk, G.C.M.G., K.C.B., F.R.S. Benjamin Daydon Jackson, Esquire, Secretary of the Linnean Society, was afterwards appointed Secretary to the Committee."

The Report is signed by all of these except Lord Avebury, who sent in a separate memorandum, which is appended to the Report, and follows it here. Lord Avebury and Mr. Seymour also add a memorandum in which they do not agree with their colleagues as to the advisability of creating a new advisory Board; this we do not think it necessary to reproduce in these pages.—Ed. Journ. Bot.]

Preliminary Observations.

The Botanical Department of the British Museum, and the Royal Botanic Gardens, Kew, are, in their primary intention, institutions of widely different characters.

The Botanical Department of the British Museum is a collection of such objects belonging to the vegetable kingdom as can be placed in a museum, and its functions are limited to the uses of such a collection for the advancement of botanic science and for the purposes of giving popular instruction and of exciting popular interest in natural history. It does not concern itself with the applications of botany, either at home or elsewhere.

The Royal Botanic Gardens, Kew, is, in the first place, an organization dealing with and giving assistance to His Majesty's Government on questions arising in various parts of the Empire in which botanic science is involved. So far it has a distinctly imperial character. It is at the same time an institution for the prosecution of theoretical botanic research, *i.e.* of botanic research carried on independent of practical ends, it is a school for advanced horticultural education, it acts as the botanic adviser of the Government on agricultural questions, and as a public garden it affords general instruction and recreation to the people.

The British Museum and the Royal Botanic Gardens, Kew, possess each of them an herbarium or collection of dried plants, together with certain botanic specimens, fruits, woody parts, &c., which cannot be "laid in" in an herbarium as ordinarily understood. For the present purposes, however, in speaking of the herbarium, we may suppose such objects to be included. These herbaria, with the libraries attached to them, are, so far as pertains to the present inquiry, the only collections of a similar character belonging to the two institutions. The two herbaria having features in common, have nevertheless each special features. The differences are in part due to the way in which each collection has grown up, as will be seen from the following brief historical statement.

History of British Museum Collections.

Certain botanic collections formed part of the British Museum at its institution in 1753. These were the collections of Sir Hans Sloane, consisting of dried plants, the Sloane Herbaria, often spoken of in this report as the pre-Linnean Herbaria, and of woods, fruits, &c. No very large additions seem to have been made to these collections between 1753 and 1820.

The Royal Botanic Gardens at Kew, begun in the middle of the eighteenth century by the then Dowager Princess of Wales, were very largely developed during the latter part of that century and the beginning of the next by His Majesty George III., with the assistance and advice of Sir Joseph Banks. Though the gardens were the private property of the Crown, they were enriched, at the expense of the nation, by the results of various expeditions, and by specimens obtained from the Colonies and elsewhere. The living plants were cultivated in the gardens, the dried plants were retained by Sir Joseph Banks, and thus contributed to form the valuable herbarium known as the Banksian Herbarium. This herbarium Sir Joseph Banks kept at his residence in Soho Square; but there is some evidence that a duplicate herbarium was kept in the gardens. This latter, however, subsequently disappeared. At his death, in 1820, Sir Joseph Banks bequeathed this Banksian Herbarium, together with his library, drawings, &c., "usually kept in . . . , my house in Soho Square," to his librarian, Robert Brown, for "his use and enjoyment during his life, and after his decease to the British Museum." One condition of the bequest was that Robert Brown should "assist the superintendent of the Royal Botanic Gardens at Kew as he also now does." The Will provides that the collections might with Robert Brown's assent pass into the hands of the Trustees of the British Museum during Robert Brown's lifetime. In 1827 this transference was made, Robert Brown becoming at the same time an Under Librarian of the Museum, with the additional title of "Keeper of the Banksian Botanical Collections," he having charge of these alone, and not of the other botanical collections. In 1835 Robert Brown became "Keeper of the Botanical Department," the whole of the botanical collections being placed under his care. The foundation of the botanical collections at the British Museum was thus supplied by the Sloane Herbaria and the Banksian Herbarium, together with fruits, woods, &c. Under Robert Brown and succeeding keepers the botanical collections were increased. The Banksian Herbarium, by the addition of new specimens, was developed into what is now known as the "General Herbarium," the Sloane Herbaria being kept distinct. In 1859 a separate collection of British plants, the British Herbarium, was formed. In 1881, when the Natural History Department was transferred from Bloomsbury to Cromwell Road, the General Herbarium consisted of 509 cabinets of specimens. Since that date large additions have been made; the number of cabinets is now 1560, containing 1,673,000 specimens.

History of Kew Collections.

After the death of King George III. and of Sir Joseph Banks in 1820, the Royal Botanic Gardens at Kew, remaining a private garden of the Crown under the charge of the Lord Steward, though assisted by the Treasury and the Admiralty, did not for several years undergo any great development. In 1841, however, it ceased to be a private garden of the Crown. The management was transferred to Her Majesty's Commissioners of Woods, Forests, Land Revenues, Works and Buildings, and William Jackson Hooker, then Regius Professor of Botany at Glasgow, was made director. Professor, afterwards Sir W. J. Hooker, brought with him from Glasgow to Kew, and for some years kept in his own residence, a a large private herbarium, described at the time as the largest in England, if not in the world. This he continued to increase. In 1854 Mr. G. Bentham presented to the nation, on certain conditions, his private herbarium, about one-fifth the size of that of Sir W. J. Hooker. This was deposited in a house belonging to the Crown, formerly occupied by the King of Hanover, the use of it being granted for that purpose. In the following year the herbarium of Sir W. J. Hooker, still a private herbarium, was transferred to the same building. In 1865, upon the death of Sir W. J. Hooker, his herbarium was purchased by the State, and this, with the smaller herbarium given by Mr. Bentham, was the beginning of the present national herbarium at the Royal Botanic Gardens. Since the death of Sir W. J. Hooker large additions have continued to be made to the herbarium; and it now consists of more than 2,000,000 specimens, and is the recognised official depository of all botanic collections acquired through Government expeditions.

In an herbarium specimens may be present which are the actual plants made use of in the description of new species by the authors of those species. Such specimens, usually spoken of as "type specimens," have a value of a different order from that of other specimens, and an herbarium may, in general terms, be spoken of as more or less valuable according to the number of "type specimens" which it contains. Owing to its mode of origin the General Herbarium of the British Museum is of special value inasmuch as it contains the "type specimens" of the Banksian Herbarium. It is also of value, though of less value, by reason of the type specimens contained in the collections acquired since 1827; the additions to it since the transference to Cromwell Road contain many "type specimens," but the increase in such specimens has not been proportionate to the general increase. The pre-Linnean Sloane Herbaria are mainly of value for antiquarian or historical researches, and the value of the British Herbarium lies chiefly in the convenience which it offers for all enquiries limited to British plants. The Herbarium of the Royal Botanic Gardens at Kew has, on the other hand, a special value on account of its being very rich in type specimens of a date posterior to that of the Banksian Herbarium, more particularly of the plants of India and of the British Colonies and Possessions. In all these it is far richer than the Herbarium at the British Museum, so much so that, as a rule, botanists engaged in researches in systematic botany find it profitable to work at Kew in the first instance, visiting the British Museum subsequently. . . . .

History of previous Inquiries.

A Royal Commission "to inquire into the constitution and government of the British Museum," appointed in 1847-8 and reporting in 1850, put to Mr. Robert Brown, then Keeper of the Department of Botany, questions relating to the desirability of his (botanical) collections being united with a botanic garden such as that at Kew. Mr. Robert Brown was of opinion that such a step was not desirable, basing his opinion on the distance of Kew, on the absence from the gardens of an adequate library, and on the slight advantage to botanic researches carried on in an herbarium of a connection with a botanic garden.

In 1858, upon the death of Mr. Robert Brown on the 10th of June in that year, the Trustees instituted an inquiry, by means of a sub-committee, as to "whether it may be expedient or otherwise to remove the botanical collection from the Museum, as it presents a case in some degree peculiar." The sub-committee heard the evidence of Sir W. J. Hooker, Dr. J. D. Hooker, and Dr. Lindley in favour of the removal, of Mr. G. Bentham in favour of moving the Banksian Herbarium only, of Professor Owen that the removal of the botanic collections would not be any material disadvantage to the other great natural history collections, and of Dr. Falconer, Sir Charles Lyell, and Professor Henfrey against the removal. The sub-committee, partly influenced by the conflict of opinion among the witnesses, and partly, if not chiefly, by the fact that the herbaria and library at Kew were largely private property and by the want of accommodation there, reported against the removal.

Towards the end of the same year a memorial signed by nine eminent Zoologists and Botanists was presented to the Chancellor of the Exchequer urging upon Her Majesty's Government the recommendation that the whole of the Kew Herbarium, a large portion of which was at that time private property, should become the property of the State, that the Banksian Herbarium and the fossil plants at the British Museum should be transferred to Kew, and that suitable accommodation should be made for the national scientific museum of botany so formed.

In 1860 a Select Committee of the House of Commons appointed to consider the separation of the Natural History Collections from the rest of the British Museum, incidentally received evidence relative to the removal of the botanical collections to Kew, but in its Report merely points out the relatively small needs of the Keeper of Botany.

In 1871 the important Commission on Scientific Instruction and the Advancement of Science, generally known as the Devonshire Commission, was appointed. The fourth Report of the Commission presented in 1874, and dealing with the British Museum as a whole, discusses at length proposals for dealing with "the Botanical Establishments now maintained at the expense of the State, the one at the British Museum, the other in the Royal Gardens at Kew," concerning which it had received much evidence. It says "the evidence which has been laid before us leaves us no alternative but to recommend that these two Botanical collections . . . should not be merged into one, but that both be kept in a state of efficiency, and that the special scientific direction which each has spontaneously taken should be retained." The special direction here referred to is in the case of Kew that of systematic botany, in the case of the British Museum that of botanical palæontology. The Commission were also impressed with the desirability of having in the British Museum "a geographically arranged collection as the complement of the purely systematically arranged collection at Kew." The Commission accordingly recommended "That the Collections at the British Museum be maintained and arranged with special reference to the geographical distribution of plants and to palæontology, and that the collections at Kew be maintained and arranged with special reference to systematic botany." This recommendation has not been carried out. The Department of Botany of the British Museum has not been developed in the direction of botanical palæontology. The collections of fossil plants are not under the charge of the Keeper of Botany, but are under the charge of the Keeper of Geology. The general herbarium is not arranged geographically, but systematically; indeed it is actually less geographically arranged than is the herbarium at Kew, since in the latter, species within each genus are arranged geographically, whereas in the former a systematic arrangement is maintained to the end. Except for this geographical feature of the Kew Herbarium, and for the fact that each herbarium contains "type specimens" which the other does not, the two herbaria may be considered as duplicates one of the other. The objects which the Devonshire Commission had in view when it recommended the maintenance of both establishments have not been attained.

The question of the union of the botanical collections of the British Museum and of Kew has thus been raised again and again. Each time the question has been decided in the negative, though not always for the same reason; and the fact that the question has from time to time been raised anew may be taken as indicating either that the circumstances affecting the question have from time to time changed (which is the case), or that the previous decision did not appear to be based on convincing grounds. It is to be noted also that union at Kew has been most usually suggested, not union at the British Museum. . . . .

Union of the two Herbaria desirable.

The views of the Trustees of the British Museum on the subject of the union of the two herbaria are contained in their letter to the Treasury of the 12th July, 1899; to this, we have ascertained, they have nothing to add. We observe, however, that they make no reference either to the intrinsic increase of efficiency which must arise from the amalgamation of two institutions and staffs now doing the same work, or to the scientific advantage of having type specimens collected under one roof instead of two. Their views on other points do not appear to us to be supported by the evidence which we have had before us.

Taking so far as we have been able everything into consideration, and regarding the question from the point of view of the main purpose for which the two collections are maintained, namely, that of botanic research, and therefore dealing in the first instance in the case of the British Museum with the General Herbarium only, we have come to the conclusion that it is desirable that the two herbaria should be united into one. . . . .

Taking, then, into consideration all the various arguments which have been adduced on the one side and on the other, we have come to the conclusion that statutory powers should be obtained for the transference of the general herbarium of the British Museum to Kew, accommodation for it and for the present herbarium at the Royal Botanic Gardens, Kew, being provided there.

Besides the General Herbarium, the British Museum possesses the Sloane collections and other pre-Linnean herbaria. It has been urged by some witnesses that these being mainly of historic or antiquarian value should be retained at the British Museum, as being near to the Departmental Botanical Library, which is at present maintained there, and also not far from the National Library at Bloomsbury. The proximity of the Linnean Herbarium, now in possession of the Linnean Society at Burlington House, has been brought forward as a similar reason. But it seems only natural that the Sloane Herbaria should as heretofore go with the Banksian Herbarium, which forms the nucleus and perhaps the most valuable part of the General Herbarium. And in respect of the advantage of such historic herbaria being in close proximity to a library containing old botanic books, it may be remarked that if the General Herbarium is removed to Kew the chief reason for maintaining a Departmental Botanic Library at the British Museum is done away with, and the main part of the Library should follow the Herbarium to Kew. And indeed it might be further urged that steps should be taken to ensure that the National Botanic Establishment, such as Kew would then be, should be the seat of a Botanic Library as complete as possible.

In respect to the Linnean Herbarium, its retention in so isolated a manner by the Linnean Society would become a still greater anomaly than it is at present if the Sloane Herbaria were removed to Kew, and the same may be said of the collection of the East India Company (including the Wallichian types) also in possession of the Linnean Society. It may fitly be urged that the State ought to become the owners of the Linnean Herbarium and other historic collections now the property of the Linnean Society, if that Society could be induced to part with them, in which case they too should be transferred to Kew.

There remains to be considered the British Herbarium. This is the only example of that geographic arrangement that was recommended by the Devonshire Commission as being one of special directions in which Botany at the British Museum ought to develop, and it existed antecedent to that Commission. This is an herbarium of a special character with a corresponding value. Specimens of plants found in Great Britain and Ireland are not placed in the General Herbarium; they are collected together in this British Herbarium. The British Herbarium, like the General Herbarium is for the purposes of research, and can only be consulted by investigators, not by the general public.

The objections which were referred to above as being urged against the removal of the General Herbarium to Kew on account of the distance of Kew from the centre of London, apply more closely to the British Herbarium. It is this which is most frequently consulted by the busy man spoken of above. But as we said above we cannot attach great weight to these objections; and obviously if all the rest of the herbaria are transferred to Kew the British Herbarium must go too; it could not be left alone at the British Museum. In thus recommending the transference to the Royal Botanic Gardens at Kew of so large a portion of the botanic collections at present at the British Museum, of all that portion in fact which is used for scientific research, we are recommending a course of action of a very grave nature. We are aware of the gravity of the recommendation. . . . .

We have now to deal with an aspect of the botanic collections of the British Museum on which we have not yet touched. So far we have been considering those collections as an instrument of scientific research; but they have in addition, more especially since the transference from Bloomsbury to Cromwell Road, served another purpose. Like the Department of Zoology, the Department of Botany under the guidance of the Keeper has instituted and developed an exhibition of botanic objects calculated to excite popular interest and to impart popular instruction in the phenomena of the vegetable world. The exhibition so formed has also been found to serve as an instrument of education to students of botany and as a useful adjunct to the equipment of teachers in London. The botanic collections in fact consist of two distinct parts—firstly, the herbarium to which the general public is not admitted, which is exclusively an instrument of scientific research; and secondly, the popular and illustrative collection displayed in the gallery to which the general public is freely admitted; some objects serving a like purpose are also exhibited in the Central Hall.

We have already come to the conclusion that the first-named botanic collections which serve for research should be transferred from the British Museum to Kew. We have now to consider what course should be recommended in respect to the second, the popular and illustrative botanic exhibition. In doing so we may assume without discussion that a national botanic collection, paid for by the State, ought to serve the purpose of exciting popular interest in, and of spreading among the people a knowledge of the vegetable kingdom. In considering this question we have to bear in mind the facts that at Kew the collection of living plants already serves such a purpose among others, and that the Economic Museums at Kew form in part also a popular exhibition. The installation at Kew of a popular illustrative botanic exhibition similar to that existing in the public gallery at the British Museum would be a continuation of the work already done at Kew. And the value of such an exhibition as a means of developing botanic knowledge among the people would be increased by its being placed in contiguity with the living plants. Indeed, we recommend that steps should be taken, as opportunity offers, in this direction. But we do not think that such a popular exhibition at Kew should be substituted for the exhibition at present existing at the British Museum. On the contrary, led by the following considerations, we have come to the conclusion that this should be maintained. In the first place, the argument based on the distance of Kew from the centre of London, though not having, in our opinion, an importance in reference to research, does seem to us to be very strong in reference to an exhibition intended for the general public. We believe that it would be a serious evil if the opportunities for learning something about the vegetable kingdom, which are now placed before the visitors to the British Museum, were done away, and such opportunities were open only to those able to make the longer journey to Kew.

Fossil Plants.

The British Museum contains botanic collections other than those which we have hitherto considered, namely, the fossil plants. Concerning these we have received conflicting evidence. On the one hand, we have been told that from the point of view of scientific research the interest and value of fossil plants is greater to the botanist than to the geologist, and this has afforded a reason for transferring them as well as the herbaria to Kew; to this may be added the further reason that, in many respects at least, for the study of these fossil plants access to living plants is especially useful. On the other hand, it must be remembered that the fossil plants which are preserved in the British Museum are with some few exceptions placed in, and regarded as belonging to, the Department, not of Botany, but of Geology, and it has been stated to us that the removal of the fossil plants to Kew would mean a dismemberment of the geologic collection. It must be borne in mind in reference to this question that the Geological Department of the British Museum is not in the ordinary sense a geologic collection, that is, one having relation to what is called stratigraphic geology; it is essentially a palæontologic collection. And it is by reason of this nature of the collection that fossil plants are placed in the collection together with the fossil animals. The position of palæontology in the scientific hierarchy is a peculiar one. It is often ranked as a separate science; and yet from one point of view, one namely which does not regard the geologic side of the matter, it appears as a mixture of zoology and of botany. From the standpoint of botany it would be satisfactory were the National Botanic Collections at Kew completed by the inclusion of the fossil plants; but we feel that, considering the circumstances in which the fossil plants are housed at the British Museum, we should in a certain sense be going beyond our instructions, and be taking up a definite attitude towards palæontology, if we were to recommend that fossil plants, being botanic specimens, should, together with the botanic collections, be transferred from the British Museum to Kew. We therefore make no recommendation concerning the collection of fossil plants. . . . .

Recommendations.

We accordingly recommend:—

1. That the whole of the botanic collections at the British Museum now administered by the Keeper of the Department of Botany under the Trustees, with the exception of the collections exhibited to the public, be transferred to the Royal Botanic Gardens, Kew, and placed in the charge of the First Commissioner of His Majesty's Works and Public Buildings under conditions indicated below, adequate accommodation being there provided for them.
2. That a Board, on which the Trustees of the British Museum, the Royal Society, and certain Departments of His Majesty's Government should be directly represented, be established in order to advise on all questions of a scientific nature arising out of the administration of the Gardens, the powers and duties of the Board, its relations to the First Commissioner and to the Director, as well as the position of the latter and the functions of the Gardens, being defined by Minute of the Lords Commissioners of His Majesty's Treasury.
3. That the illustrative botanic collections now publicly exhibited at the British Museum be maintained, and, so far as it is possible and expedient, enlarged and developed with the view of increasing popular interest, and imparting popular instruction in the phenomena of the vegetable world, and be placed under the charge of an officer of adequate scientific attainments, responsible to the Director of the Natural History Departments.
4. That upon the transference of the botanic collections from the British Museum to the Royal Botanic Gardens, such arrangements be made both in respect to the accommodation of the collections and the staff administering them, that they shall fully serve the purposes which they have hitherto served.
5. That the botanic collections consisting of fossil plants, now in the charge of the Keeper of the Department of Geology in the British Museum, be maintained for the present under the same conditions as heretofore.

LORD AVEBURY'S MEMORANDUM.

I regret that I am unable to concur with my colleagues in their recommendation that the herbarium now in the British Museum should be transferred to Kew.

It seems no doubt at first sight an anomalous arrangement that there should be two national herbaria; firstly, on account of the expense; and secondly, because botanists in some cases have to consult two collections instead of one. But the evidence shows that the saving of annual expense through the suggested fusion would be small, and that the initial outlay for building cabinets, &c., would be heavy. The alleged inconvenience seems to me to be exaggerated, and affects only a few of those engaged in systematic botany, who are thus obliged to consult two herbaria instead of one; while on the other hand, to those engaged in other departments of botany, the existence of the two herbaria is an advantage.

I deprecate the proposals contained in the majority Report for the following reasons:—

1. The British Museum is the greatest museum in the world, and is justly the pride of the nation. To dismember it, by depriving it of so integral a part as the Botanical Department would be destructive of its unique character as a fully representative museum, and specially of a natural history museum; would be vehemently opposed by many, if not most, British botanists, and as it seems to me, would be a great injury to science.

2. To London and country botanists the British Museum is much more accessible than Kew.

3. The plan proposed would separate the fossil, from the recent, plants.

4. It would involve the creation of a new Board.

If, on the other hand, Kew Gardens and the British Museum were brought into closer relations, as recommended in the Report which I have signed in conjunction with Mr. Seymour, several advantages would result; for instance, the officers of the Museum would have access to the living plants; while those of Kew Gardens would have access to the British Museum library and the collection of fossil plants.

SHORT NOTES.

LIMONIUM HUMILE Mill. — In Journ. Linn. Soc. xxxv. 77, Mr. Druce follows Dr. Otto Kuntze in adopting *Limonium rariflorum* as the name of the plant which stands in the last edition of the *London Catalogue* as *Statice rariflora* Drej. There can, however, be no doubt that the proper name for this under *Limonium* is *L. humile* Mill. Dict. no. 4 (1768). Miller's description is based entirely on the English plant—he does not record the species from any extra-English locality—described by Ray (Hist. Plant. iii. 247) under the name "Limonium Anglicum minus, caulis ramosioribus, floribus in apicis rariùs sitis." This was sent to Ray by Dale from the well-known Essex localities whence specimens collected by him are in the National Herbarium. Dr. Kuntze considers Miller's name as "= *St. bellidifolia* Gouan = *St. caspia* W."; but I think he is in error in so doing, nor am I sure that the two plants last named are identical. This, however, as well as the name to be applied under *Limonium* to either or both, is a matter for future monographers.—JAMES BRITTEN.

JUNGERMANIA SAXICOLA Schrad. (p. 279).—I can add two localities for this hepatic on the mainland of Scotland to the one from Ben Mac Dhui given by Mr. Stabler. Among rocks at the waterfall, Carn Dearg, Aviemore, alt. 1200 ft., with *Chandonanthus setiformis*, 1898; in two places at Craig-an-Lochain, Killin, one being among boulders at the base of the west precipice, alt. 1800 ft., the other on a rocky bank near the centre of the range at about the same altitude. The Shetland locality for this species is interesting, as it appears generally rather to avoid a maritime climate. It has not been found on the Faeroes, which have been well searched, nor does it occur on the islands off the west coast of Norway, according to Herr Kaalaas. It is also rather rare in the inner fjord region, but is fairly common on the east side of the country.—Symers M. Macvicar.

Note on Ghikæa Schweinf. & Volkens.—In this Journal for 1896, p. 128, I described as a new species of *Graderia* (*G. speciosa*) a plant collected by Dr. Donaldson Smith in Somaliland. I remarked that it was an interesting addition to the genus, differing from the two previously described species in its much larger, more open flowers, and in the complete disappearance of the sterile half of the anther in the posterior stamens. In the next year Drs. Volkens and Schweinfurth published (*Liste des plantes récoltées par les Princes Démètre et Nicolas Ghika-Comanesti dans leur voyage au pays des Somalis;* Bucarest) a new genus—*Ghikæa*—of the same section of *Scrophularineæ*, with one species—*G. spectabilis*. This genus, which is without doubt my *Graderia speciosa*, is retained by Engler (Bot. Jahrb. xxiii. 507, where also a figure of the flower is given, t. xiii. figs. J, K), and also by Wettstein in the Supplement to the *Pflanzenfamilien* (Nachtrag. 297), the distinguishing generic character being the complete absence of the sterile portion of the posterior anthers. Through the courtesy of Professor Engler, I have just had an opportunity of examining a flower of *Ghikæa spectabilis*, and, though there is some variation in the size of the corolla, I have little doubt that the plant collected by Dr. Donaldson Smith is conspecific with *Ghikæa spectabilis*. I have thought it worth while to mention this, as it is obvious from the construction of the name, *Ghikæa spectabilis*, that *Graderia speciosa* has been overlooked not only by the original founders of *Ghikæa*, but also by subsequent workers, all of whom make it a rule to retain through generic vicissitudes the original species-name of a plant.—A. B. Rendle.

NOTICE OF BOOK.

Irish Topographical Botany. By Robert Lloyd Praeger, B.A., B.E., M.R.I.A. 8vo, cloth, pp. clxxxviii, 410; six maps. Price 10s. London: Williams & Norgate.

Those who know something of Mr. Praeger's work in the study or the field will expect a really good book from his pen; and it may be said at once that this anticipation is here fulfilled. It is, indeed, many years since anything of so much value to British botanists generally has appeared, although one would hardly have looked for this in a treatise limited to Irish plants.

The author states in the Preface that he was led to undertake his task by observing the absence of census-numbers for Ireland in the last edition of the *London Catalogue* (1895). At that time, Messrs. Colgan and Scully's second edition of *Cybele Hibernica* was in an advanced state of preparation. Mr. Praeger states that its publication "made *Irish Topographical Botany* a possibility"; and that the latter "may fairly be described as a companion to" the former. This is curiously exact, even as regards bulk; the volumes weigh almost precisely the same (about 2½ lb.): both are beautifully printed on good paper, and suitably bound. The later work excels in its maps, the production of which has delayed its appearance for a month or two; the large one facing the title-page and those illustrating the petrography and orography of the country, are especially valuable.

The chief point of contrast between the two books lies in the subdivision of the country. *Cybele* retains the twelve districts of the first edition; Mr. Praeger has adopted H. C. Watson's system of vice-counties, making forty in all. These correspond with the counties, except Galway and Cork (with three divisions apiece), Kerry, Tipperary, Mayo, and Donegal (with two); bringing the arrangement into substantial agreement with that now generally adopted in Great Britain. The Introduction treats each of these briefly, but adequately; giving the area, greatest elevation, soils, lakes, rivers, &c., together with the number of species at present known to occur, and a list of those which are rare, or restricted to the vice-county.

Almost every page of this Introduction will repay careful reading, and the average Englishman has a good opportunity of correcting his ignorance as regards the sister isle—*e. g.* it may be news to most of us that "Ireland is, for its size, the flattest island in the world"; that "Kerry has the same average temperature in December as Bordeaux and Rome"; while "in July, Sligo is no warmer than Archangel"; and that "the Central Plain of Ireland is the largest tract of Carboniferous Limestone in Western Europe."

The total Flora (exclusive of *Characeæ*, which, however, are fully treated at the end) is reckoned at about 1160 species, on the basis of the current *London Catalogue;* which Mr. Praeger reduces to 1019 species, or 1138 species and subspecies, in his arrangement. The number of discoveries made in recent years makes it probable that this aggregate will still be considerably increased when the country has been more thoroughly explored.

The names adopted in the *Cybele* are retained throughout; wisely, doubtless, considering the state of flux to which the prevailing fashion has reduced our nomenclature. Of Watson's "types," the British is represented in Ireland by no less than 98 per cent., the Germanic by only 11·7 per cent. To the North American group *Hieracium auratum* Fr. might well have been added.

Sections are devoted to the plants of the sea-coast; of sandy and gravelly soils, of bogs, of marshes, of rivers and of lakes; they are models of accuracy and terseness, revealing the mind of a man who *knows* his subject, and not merely knows *about* it. This, indeed, applies generally to the book, which is singularly free from repetitions and redundancies, with a good, breezy, vigorous style, undisfigured by "fine writing," affectations, or "sloppiness."

Mr. Praeger sketches out in an interesting fashion the history of several certainly introduced species (e. g. *Linaria minor*, *Arenaria tenuifolia*, *Matricaria discoidea*); he also shows, with regard to questions of doubtful nativity, an unusually unbiassed judgment and a rare perception of probabilities. The full and up-to-date bibliography of Irish topographical botany is one of the most serviceable helps that could be given to students.

"In the consistent use of *latest* records, this work exhibits a departure from the practice usually followed in Floras. . . . . In the present case, the whole object is to exhibit a view of the flora of Ireland *as it is;* to give a present-day census of the plants of the country." Accordingly, Mr. Praeger prints after each vice-comital record of a plant the name of the most recent, rather than that of the first observer. He argues that "the names of persons are here published, not with any reference to original discovery, but simply as vouchers for the records"; and that *Cybele* has already done full justice to historical and original claims. Opinions will probably differ as to the course adopted; on the whole, it seems justifiable.

The "Field Work" chapter shows how ably Mr. Praeger has marshalled his available forces, and what an indefatigable outdoor worker he himself is. Roughly speaking, 20,000 county records (500 species in 40 divisions) were required before the book could be produced; 12,000 of these were lacking in 1895, 15,000 being the number actually aimed at—and obtained! Monaghan (477) alone fails to reach the prescribed standard, and this exception is due to an accident. The author devoted practically all his holidays for five years (roughly, two hundred days) to this object; the "ordinary day" being twelve hours, and the distance covered varying from fifteen to thirty-five miles. Materials to the extent of some five thousand sheets of specimens have been placed in the National Museum, the critical plants named by recognized authorities—an excellent plan.

Thus we have, practically, a complete survey of Irish plant-distribution down to the present time. Varieties are not usually dealt with, and some subspecies are still too little known for treatment (e. g. *Euphrasiæ*, with the exception of *E. salisburgensis*). Misprints are few and unimportant; a curious one is *Hieracium vulgatum* var. "*inaculeatum*" for *maculatum;* and *H. rigidum* var. "*glabrescens*" should be *scabrescens*. *Carex Œderi* Retz is not even recognized as a subspecies. Two or three plants are "calcicole" in Ireland which could hardly be so reckoned in England—e.g. *Juncus glaucus*, not uncommon here both on sand and clay. The Lough Mask (East Mayo) station for *Daboecia polifolia*, about which the author is not satisfied, may be accounted for by its occurrence in some plenty on the west side of the lake. *Saxifraga umbrosa* (decidedly "calcifuge") grows sparingly on the limestone at its south-west corner.

In conclusion, the book is again warmly recommended to all who take an interest in British botany, as being full of interest and well worth its cost.

EDWARD S. MARSHALL.

ARTICLES IN JOURNALS.*

Bot. Gazette (24 July). — C. E. Allen, 'Origin and nature of middle lamella.' — C. E. Preston, 'Structural Studies on Southwestern *Cactaceæ*.' — A. Rehder, '*Basilima* & *Schizonotus* of Rafinesque.'

Bot. Zeitung (15 Aug.). — A. Scherfel, 'Zur Phylogenie einiger Gruppen niederer Organismen' (1 pl.).

Bull. de l'Herb. Boissier (31 July). — E. de Wildeman & Th. Durand, 'Plantæ Gilletianæ Congolenses' (cont.). — H. Schinz, 'Beiträge zur Kenntnis der Afrikanischen Flora' (cont.). — A. de Coincy, 'Qu'est-ce que l'*Echium Wierzbickii* Haberle?' — G. Hegl, 'Das Obere Tösstal' (cont.).

Bull. Torrey Bot. Club (July).—N. L. Britton, 'Thomas Conrad Porter' (1822–1901; portr.).—W. A. Cannon, 'Anatomy of *Phoradendron villosum*' (2 pl.). — C. Flahault, 'Phytogeographic Nomenclature.'

Gardeners' Chronicle (27 July). — *Begonia Forgetiana* Hemsl., sp. n.—(3 Aug.). W. B. Hemsley, 'Dr. Augustine Henry' (portr.).

Journal de Botanique ("Juin"; received 26 July). — P. Van Tieghem, 'Sur le genre *Lophira*.' — P. Parmentier, 'Recherches sur le pollen des Dialypétales' (cont.).

Journ. Linnean Soc. (Bot. xxxv. no. 243; 15 July). — W. B. Hemsley & H. H. W. Pearson, 'Plants from the Bolivian Andes' (contains no novelties). — G. Massee, 'Redescription of Berkeley's Types of Fungi' (cont.; 2 plates).

Minnesota Botanical Studies (20 July). — E. M. Freeman, 'Minnesota *Uredineæ*' (1 pl.).—*Alaria curtipes* De Alton Saunders, n. sp. (1 pl.). — F. K. Butters, 'Minnesota *Xylariaceæ*.' — W. A. Wheeler, 'Flora of Red River Valley' (8 pl.). — H. B. Humphry, *Gigartina exasperata* (1 pl.). — M. G. Fanning, 'Algæ of St. Paul City water' (4 pl.).—D. Lange, 'Revegetation of Trestle Island.'—J. C. Atkin & E. W. D. Holway, 'Violet rusts of N. America' (1 pl.).—H. L. Lyon, 'Embryogeny of *Nelumbo*' (3 pl.).

Oesterr. Bot. Zeitschrift (Aug.). — A. Zahlbruckner, 'Vorarbeiten zu einer Flechtenflora Dalmatiens' — V. Schiffner, '*Calycularia crispula* & *C. birmensis*.'—E. Hackel, 'Neue Gräser' (*Panicum*). A. v. Hayek, 'Flora von Steiermark' (cont.).—M. Soltoković, 'Die perennen Arten der *Gentiana* aus der Section *Cyclostigma*' (concl.).

Rhodora (July; received 3 Aug.).—T. Meehan, 'T. C. Porter.'—W. Deane, '*Ericaceæ* of New England.'—M. L. Fernald, '*Scutellaria parvula* & *S. ambigua*.' — R. G. Leavitt, 'Embryology of New England Orchids' (1 pl.). — M. A. Day, 'Herbaria of New England' (cont.). — (Aug.; received 24 Aug.). W. Deane, '*Umbelliferæ* of New England.' — R. S. Smith, 'Aerial runners in *Trientalis americana*.'—R. E. Schuh, '*Rhadinocladia*.'

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

BOOK-NOTES, NEWS, &c.

We regret to learn that Mr. George Nicholson, who has been at Kew since 1873, has been compelled by ill-health to resign the Curatorship of Kew Gardens. Mr. Nicholson was at one time a diligent student of British plants, and a frequent contributor to this Journal. Mr. J. R. Jackson, the amiable Keeper of the Kew Museums, with which his connection began in 1858, is also retiring from the service of the Gardens. Mr. Nicholson is succeeded by Mr. W. Watson, the Assistant-Curator, and Mr. Hillier will replace Mr. Jackson.

Mr. Arthur Smith, of 5, Cavendish Street, Grimsby, Lincolnshire, asks us to insert the following:—"The Alien Flora of Britain. I am anxious to have notes and records of Alien Plants which occur in Britain, and beg to ask your assistance in the matter. If you are willing to co-operate, I should be glad to have notes of such from your locality, and, as far as possible, specimen plants. Should you have a knowledge or theory how the plant came to its situation, please give it; and in sending plants give names, if known—if not, I will do my best to name them. In any case always give *colour* of flower." We believe Mr. S. T. Dunn has for some time been engaged on a work dealing with our introduced plants.

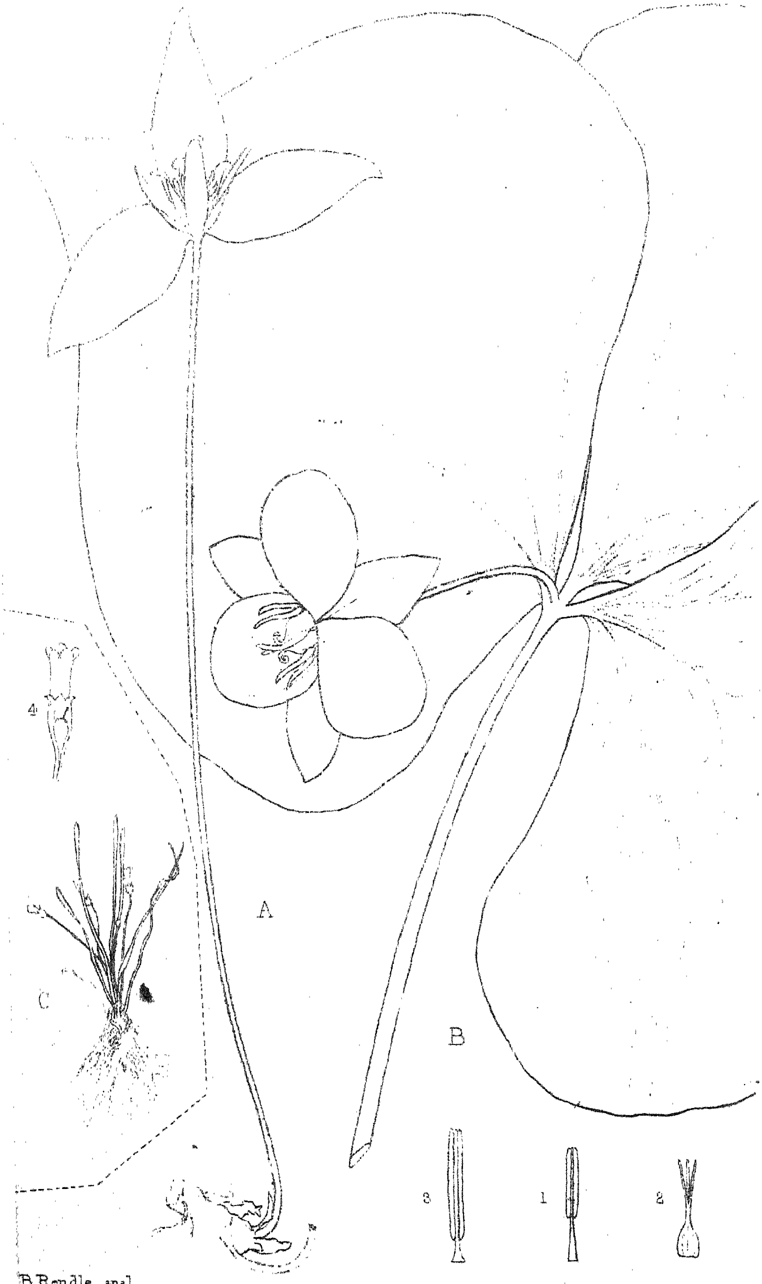
The *Gardeners' Chronicle* for Aug. 3 gives a list of Selborne plants, "the direct descendants of those which White must often have seen." "The names are not arranged in any order," and the list is thus not easy to consult; but we note among the names *Mimulus luteus*, which we do not think White is likely to have met with. It will be remembered that a complete list of the plants —440 in number—actually noted by White as occurring at Selborne was printed in this Journal for 1893, pp. 289-294.

We should have mentioned earlier the death of the eminent and venerable Japanese botanist Ito Keisuké, which took place at Tokyo on the 21st of January, in his ninety-ninth year. Some account of his work, from the pen of his grandson, Mr. Tokutaro Ito, will be found in this Journal for 1887, accompanied by a portrait: a later portrait and account is given in the *Annals of Botany* for September, 1900.

Mr. R. F. Towndrow is known as a writer of graceful verse, and now another botanist, Mr. F. T. Mott, puts forward claims to the laurel in a little volume called *The Benscliff Ballads*. One of these—"A Summer Campaign"—narrates an excursion of four botanists

"Where the shrubby *Suæda* just fringes the land,
And *Salsola* spreads out his thorns on the sand. . . .
Where *Osmunda* sat throned in a leaf-sheltered nook,
And the slender *Œnanthe* peered up from the brook.

"They ransacked the land and they searched by the sea,
And brought back their vasculums filled with *débris;*
Rhynchospora alba and *Myrica Gale*
And *Triticum repens*, the blue *littorale*."



B. Rendle anal.
Alcock del. et lith.

West, Newman imp.

A. Trillium pusillum *Mich.* B. T. Rugeli *Rendle*.
C. Limosella aquatica *L.* Var. tenuifolia *Hook. f.*

NOTES ON TRILLIUM.

By A. B. Rendle, M.A., D.Sc.

(Plate 426.)

Certain enquiries by American botanists as to the old types of the species of this genus induced me to go somewhat exhaustively into the matter. As repeatedly happens, the richness of the National Collection in original and classic specimens was most helpful in the elucidation of the more difficult forms, and I was in hopes of being able to make a general revision of all the species. But it soon became evident that, without a much larger suite of specimens than at present exists either at the British Museum or Kew, a general monograph which would add sufficiently to revisions already in existence was out of the question. It seemed, however, advisable to publish a careful account of the original specimens, since their detailed description should be of considerable help to American workers, who, having the great advantage of studying the plants in the field, and of obtaining an unlimited supply of specimens, might approach with confidence the subject of a monograph, if once the identity of the earlier species were established.

I have included a few notes on certain species and forms which impressed me as more or less distinct; some of them are based on plants from Rugel's collection in the mountains of Carolina and Tennessee, most of which cannot be consulted except in the National Herbarium. Through the kindness of Mr. F. W. Burbidge, Mr. T. Smith of Newry, and several others, I have been able to examine cultivated specimens of a number of the species.

i. *Species with sessile flowers. Stigmas sessile.*

1. Trillium sessile L. Sp. Pl. 340 (1753). Trillium flore sessili erecto.

Linnæus cites the following:—

1. Paris foliis ternatis, flore sessili erecto. *Gron. virg.* 44.
2. Solanum virginianum triphyllum, flore tripetalo atropurpureo in foliorum sinu, absque pediculo, sessili. *Pluk. alm.* 352, t. 111, f. 6.
3. Solanum triphyllum, flore hexapetalo: tribus petalis purpureis, cæteris viridibus reflexis. *Catesb. car.* i. p. 50, t. 50.

We are fortunate in possessing the types of each of these authors in the National Herbarium.

1. Gron. virg. 44 (1743). "Paris foliis ternis, flore sessili erecto."

This plant is in the Gronovian herbarium. It is no. 856 of Clayton's Virginian plants, bearing the name, "Anonymos caule simplici nudo, ad fastigium tribus solummodo foliis vestito, e quorum medio flos purpureus irregularis exoritur: radicem habet tuberosam striatam."

The stem, which is broken off at the tuber, is 20 cm. high, reaching barely 3 mm. in diameter; the sessile bluntly elliptic-ovate leaves are mottled, 5·5–6·5 cm. long by 4 cm. broad; sepals lanceolate, blunt, 2·7 cm. long by ·8 cm. broad; petals lanceolate, acute, 3 by ·8 cm.; filaments purple, broadening from base to apex, 4 mm. long by 1·75 mm. broad at the base, anther 11 mm. (including the prolonged connective, which is 1·5 mm.); ovary subglobose, 8 mm. high; stigmas 6·5 mm. long, erect, recurving slightly at the apex.

Gronovius also cites (1) "Solanum triphyllum, flore tripetalo atropurpureo, in foliorum sinu absque pediculo sessili. *Banist. Cat. Stirp. Virg.*" (in Ray Hist. ii. 1926). There is no specimen in Banister's herbarium which forms part of Herb. Sloane. (2) "Solanum triphyllum, flore hexapetalo, tribus petalis purpureis erectis, cæteris viridibus reflexis. *Plukn. Catesb. Hist. Carol. vol. i. t. 50.*" This, which Linnæus also cites, we shall consider presently.

2. Pluk. alm. 352, t. 111, f. 6. Among Plukenet's plants in Herb. Sloane is one closely resembling this figure, and written up by Plukenet as the same plant (Herb. Sloane, 90. f. 95). The stem, cut off below, is 13 cm. long; leaves broadly elliptical, scarcely ovate, blunt, 5 cm. long by barely 4 cm. broad; sepals lanceolate, subobtuse, 2·4 cm. by ·6 cm.; petals lanceolate, subacute, 2·4 cm. by ·8–·85 cm.; filaments broadening from above downwards, 3 mm. long by barely 1·5 mm. broad at the base, anthers 8–10 mm. long excluding prolonged connective, which is 2–2·5 mm.; stigmas erect, 9 mm. long, ovary 4·5 mm. long; the stamens overtop the stigmas by barely the length of the prolonged connective. The leaves in the figure are represented as mottled; it is impossible to say whether they were so in the dried specimen.

3. Catesb. car. i. p. 50, t. 50. Catesby's figure represents a plant with larger broadly lanceolate mottled leaves, and three elongated oblanceolate purple petals standing erect and conspicuously longer than the sepals. Catesby's Carolina plants form part of Herb. Sloane, where the specimen in question is found on the same page (H. S. 212, f. 59) as his other species of the genus (figured in t. 45). The leaves, however, are elliptical and blunt, not elongated as in the figure, and closely resemble those of the Gronovian and Plukenet plants. They are mottled, 6·8–7 cm. long, 4–4·3 cm. broad; as in the Gronovian and Plukenet plants they are 3–5-nerved, the two outer nerves being less conspicuous or absent. The stem, cut off at the base, is 10·5 cm. long, and reaches 3 mm. in width. Sepals linear-lanceolate, obtuse, 3·5 cm. by 1 cm.; petals narrowly linear-oblanceolate, subacute, 5 cm. by ·5 cm., erect; stamens purple, conspicuously overtopping the stigmas, filaments broadening downwards, barely 3 mm. long, anthers including short prolongation of connective (·7 mm.) 15 mm.; stigmas 6 mm. or more, straight.

The specimen in Linnæus's herbarium named *T. sessile* is different from any of the above. It is a small plant with narrowly elliptical leaves, and a small shortly stalked sessile flower. Sir J. E. Smith has written "*pumilum* Pursh?"; it is without doubt *T. pusillum* Michx., to which we shall presently refer.

Dealing only with the available types cited by Linnæus, we might conclude that his *T. sessile* included two distinct plants, one of Gronovius and Plukenet with subequal lanceolate sepals and petals, and stamens half as long as the petals; and the other, that of Catesby, with narrowly linear-lanceolate petals nearly half as long again as the sepals, and stamens about one-third the length of the petals. A further difference suggested by Catesby's plate—

namely, the larger lanceolate strongly trinerved leaves with tapering tips—disappears on reference to the specimen. It is of interest to note apropos of this discrepancy that J. E. Smith, who erroneously referred Catesby's other specimen (*T. Catesbæi* Elliot) to *T. cernuum* L., remarks: "Icon Catesbæana tam informis, atque colore tam erronea est, ut eam ad nostram speciem pertinere, nisi herbarium auctoris in Museo Britannico inspexissem, minime crediderim; rara pulchraque hæc planta meliorem sane postulat" (Spicileg. Botan. 4).

Dr. J. K. Small, in a review of the "Sessile-flowered Trillia of the South-eastern States" (Bull. Torr. Bot. Cl. xxiv. 169), protests against the inclusion of many widely differing forms under a single name, and distributes under six species the varieties included by Watson ("Revision of North American Liliaceæ" in Proc. Am. Acad. xiv. 273) under *T. sessile* L. and *T. recurvatum* Beck. Dr. Britton had previously consulted my colleague Mr. E. G. Baker as to the identity of the Gronovian and Plukenet plants. Dr. Small, impressed with the dissimilarity between these and Catesby's figure, writes: "Thus we see that the first and second quoted descriptions in the *Species Plantarum* are represented by specimens which agree with each other in all essential particulars, while the third quotation is founded wholly on a plate which represents a species totally distinct from that on which the first and second descriptions were founded. Therefore the name *Trillium sessile* must be associated with the small oval-leaved plant, and the large plant must receive a name." The name given is *T. Underwoodii*. The writer states that the two species "are remarkably constant in comparative size," and "can readily be segregated on size and habit alone, and of course comparative measurements of organs would serve as an excellent basis of separation. But this is not necessary, since we have such good specific characters as exist in the flower, especially as respects the stamens and styles." The distinctive characters as given by Dr. Small are—

T. sessile.	*T. Underwoodii.*
Rootstock ovate or ascending, corm-like.	Rootstock horizontal.
Stem 1–2 dm. tall, slender.	Stem 1–3 dm. tall, stout.
Leaves oval or suborbicular, 4–8 cm. long, obtuse or acute, rounded at the base, 3–5-nerved, not mottled.	Leaves varying from ovate-lanceolate to ovate-orbicular, 8-18 cm. long, acute or short acuminate, rounded or subcordate at the base, mottled.
Sepals 2–3 cm. long, acute or acutish.	Sepals 4·5–5·5 cm. long, obtuse or acute.
Petals narrowly elliptic, slightly shorter than or longer than the sepals.	Petals lanceolate, elliptic or oblanceolate, 5·5–8·5 cm. long.
Stamens about half as long as the petals.	Stamens 3–4 times shorter than the petals.
Filaments dilated at the base, $\frac{1}{3}$–$\frac{1}{4}$ shorter than the anthers.	Filaments very short, anthers 1·5–2 cm. long, subsessile.
Styles elongated, nearly straight.	Styles almost wanting, stigmas recurved.

Let us take these characters *seriatim*. So far as I am able to judge from our dried specimens, the rootstock character is not a constant one; plants which from other points would be classed under *T. sessile* show a horizontal rootstock comparable with that of *Underwoodii*.

The size of the plant is very variable; that of Catesby's plant (*i. e.* type of *Underwoodii*) closely resembles those of the Gronovian and Plukenet specimens. On the other hand, of two specimens collected at Lexington, Kentucky, by Dr. Short, which differ in nothing but size, and would undoubtedly be considered as *T. sessile* in the most limited sense, the stem in one case is 8 cm. long by 3 mm. wide, in the other 26 cm. by 6–7 mm. wide. Cultivated specimens also often show remarkable differences in size, though alike in other respects.

The leaves of all the three historic specimens are similar; the difference in shape implied by Catesby's figure is not borne out by his specimen, the leaves of which fall within the limits of size given for *T. sessile*. Moreover, the leaves of the Gronovian plant still show distinct traces of having been mottled, and the same character is obvious in Plukenet's figure.

The sepals of Catesby's plant (3·5 cm. long), though larger than in the other two specimens, do not reach the lower limit of length assigned to *Underwoodii*. The petals (5 cm. long) are, however, conspicuously longer than the sepals, though they also fall short of the lower limit assigned to *T. Underwoodii*. The stamens are scarcely more than one-third the length of the petals, while in *T. Underwoodii* the proportion is about 1 to 2.

The length and form of the filaments is similar in all three specimens, but the anthers in Catesby's plant are one-third longer than those of the other two.

The specimens which I have examined do not show any longitudinal demarcation of style and stigma. The ovary appendages are similar in all, consisting of erect or slightly apically recurving processes which are apparently stigmatic down the whole of the inner face. Those in Catesby's plant are intermediate in length between those in the other two specimens.

Therefore, if we restrict our observations to the type specimens, it is evident that although many of the characters indicated by Mr. Small are not confirmed, yet that the Carolina plant is distinguished from the Virginian by its larger sepals, by its narrowly oblanceolate petals which are also longer both actually and relatively to the sepals and stamens, and by its longer anthers.

It is possible to arrange a limited number of herbarium specimens in a series of more or less distinct forms. Thus dealing with specimens from the Atlantic slope, we have:—1. What we may regard as typical *T. sessile* conforming to Clayton's Virginian specimen and that of Plukenet, with lanceolate to oval-lanceolate petals about equal in length to the sepals and generally about twice the length of the stamens. The plants seem, as a rule, smaller and less robust than the other forms; the leaves are bluntly ovate to orbicular.

The *T. isanthum* and *T. tinctorium* of Rafinesque (Bot. U. S. ii. 98) may belong here.

2. A form represented by Catesby's plant, having oblanceolate petals with long narrow bases standing erect in the centre of the flower, and conspicuously longer than the lanceolate to broadly linear-lanceolate sepals; stamens about one-third the length of the petals, connective scarcely prolonged above the anther. Good specimens of this form occur in Herb. Banks, labelled "Am. Sept."; the leaves are slightly larger and more elongated (elliptic-oval to ovate, 7–8 by 3·3–5·7 cm.), the petals slightly broader (6–8 mm. in breadth), while the anthers vary from 10–18 mm. in length, the connective ending almost on a level with the pollen-sacs; the stigmas vary from 4·5 to 5 mm. long, and are straight or slightly recurved at the tip only. The leaves are conspicuously mottled. Curtis's Bot. Mag. tab. 40, "taken from a plant which flowered in my garden last spring from roots sent me the preceding autumn, by Mr. Robert Squibb, Gardener, of Charleston, South-Carolina," is a good representation of the specimens.

A similar specimen occurs in a volume of plants collected by Mr. Job Lord in Carolina (Herb. Sloane, 285, f. 4); Lord's label reads: "This Plant Grows in moist fertil ground y^t has a deep & loose (or light) soil. It has three Leaves at y^e top of y^e stalk, amidst w^h stands upright one dark reddish purple Flow^r, w^n it is full; but greenish before it is full blown. You may see y^e flow^r in it's perfection in one of y^e samples, & y^e shape & mann^r of standing of y^e Leaves in y^e other. Gathered may 3^d 1704 Those spots in y^e Leaves y^t now (dried) look most green, w^n they are fresh look of y^e colour of y^e Liver of a beast, before it be sodden, as it is when taken out of y^e beast." The leaves are ovate, not exceeding 6·5 cm. in length by 4·5 in breadth. The petals which closely resemble those of Catesby's plant are 4 cm. long (sepals 2·5 cm.), and the stamens 1·2 cm. The connective is not prolonged beyond the pollen-sacs. The specimen of *Trillium sessile* in Walter's Carolina herbarium is also similar. In his Flor. Carol. 126 (1788), Walter has *T. sessile* "flore sessili erecto, petalis coriaceis purpureis."

Nearly allied to the Carolina form are some specimens from Florida ("*Trillium sessile* L.?" in herb. Chapman) which seem to approach most nearly to the idea of Dr. Small's *T. Underwoodii*. The somewhat robust stems reach 24 cm. in length and ·5 in thickness; the leaves are those of Catesby's figure, ovate to ovate-lanceolate and more or less elongated to an acute or subacute tip, mottled and prominently 3-nerved; they reach 12·5 cm. in length by 5·3 cm. in breadth. The lanceolate petals (4·5–5·5 cm. by 1·2–1·4 cm.) exceed the sepals (3·3–4 cm. long), and are 3½ to 4 times as long as the stamens; the connective is prolonged beyond the anther, and the stigmas are short (3–3·5 mm.).

A similar but somewhat smaller specimen from Arkansas occurs in herb. Nuttall.

Another similar and generally robust form with a stout horizontal rhizome, and a stem from 16 to 40 cm. long and as much as 6–7 mm. thick a little above the base, has broadly ovate to ovate-orbicular leaves, generally shortly acute or subacute, with 3–5 conspicuous nerves. The lanceolate to oblanceolate petals (4–6 cm. by ·7–1·4 cm.) exceed the lanceolate sepals (3–4·5 cm. by ·8–1 cm.), and are 3–4 times longer than the stamens. The connective is scarcely prolonged above the anther, and the stigmas are short. It embraces several of Rugel's gatherings in the mountains of East Tennessee (above warm springs, &c.), and one from the Alleghany Mountains in North Carolina. It may perhaps be *T. rotundifolium* Raf. *l. c.* 97.

The Western specimens as indicated by Watson (Proc. Am. Acad. xiv. 273) fall into two sets:—

(1) A robust plant with large broadly rhombic-ovate sessile leaves (in our specimens reaching 10 cm. long and nearly as broad), and oblanceolate to rhombic-obovate petals (5·5–6 cm. long by 1·1–2·6 cm. broad) considerably exceeding the lanceolate sepals, and 3–3½ times as long as the stamens (filaments about 2 mm. long, anthers 1·5 cm. excluding the prolonged connective, 1 mm.); stigmas short (4 mm. long).

This is the var. *californicum* Watson, *l. c.*, and the var. *giganteum* Torr. in Pacif. Rail. Rep. 4, 151, non Hook., also Greene, Man. Bay-Region Bot. 314.

The larger specimens of the Tennessee form approach this, but show less difference between size of sepals and petals.

Watson includes here var. *chloropetalum* Torr. *l. c.*, characterized by its green obovate elliptical obtuse petals, twice the length of the sepals. Greene, *l. c.* follows Torrey, and recognizes it as distinct.

(2) Similar to (1), but with shortly petiolate leaves, and the oblanceolate petals narrower, especially towards the base. In the specimens which I have examined the stigmas are larger than in (1), 6·5–7 mm., and straight.

This is the var. *giganteum* Hook. & Arn. Bot. Beechey, 402 (1841) = var. *angustipetalum* Torr. in Pacif. Rail. Rep. 4, 95 [151], (1857). I have received cultivated specimens from Messrs. Perry, of Winchmore Hill, as "*T. sessile* var. *rubrum*."

Specimens in cultivation which I have received from various sources as var. *californicum* resemble rather the robuster forms from the Atlantic side.

2. T. DISCOLOR Wray ex Hook. in Bot. Mag. t. 3097 (1831).

T. sessile var. *Wrayi* Watson in Proc. Amer. Acad. xiv. 273 (1879).

This seems to be a distinct species, and is so regarded by Small (*l. c.* 171). It is characterized by its sulphur-yellow to green, very obtuse obovate petals narrowing to a claw at the base.

3. T. VIRIDE Beck in Amer. Journ. Sci. xi. 178 (1826); Kunth, Enum. v. 123 (1850); Small, *l. c.* 173.

T. viridescens Nutt. in Trans. Amer. Phil. Soc. xv. (new ser.) 155 (1837).

T. sessile var. *Nuttallii* Watson in Proc. Amer. Acad. xiv. 273 (1879).

This seems a good species as indicated by Dr. Small, who also pointed out the identity of the plants of Beck and Nuttall.

The absolute size of the flowers varies considerably, one of Nuttall's type specimens having remarkably long and narrow sepals and petals. The species can, however, be distinguished by the claw-like, differently coloured base of the generally narrow greenish petals. As Dr. Small indicates, its affinity is with *T. recurvatum* Beck. The most nearly allied of the forms of *T. sessile* is the Carolina form of Catesby, &c., which recalls *T. viride* in its erect petals with their elongated narrow bases.

Missouri, Arkansas.

4. T. RECURVATUM Beck; Watson, *l. c.*; Small, *l. c.* 174.

T. unguiculatum Raf. Bot. U.S. ii. 98 (1830).

T. unguiculatum Nutt. in Trans. Amer. Phil. Soc. *l. c.* 155 (1837).

Distinguished from *T. viride* by its stalked leaves, ultimately recurved sepals, and proportionately broader petals. It is interesting to note that the same name was given independently by Rafinesque and Nuttall. Beck in the original description says, leaves "sessile or on very short petioles." Can the "sessile" refer to the *T. lanceolatum* Boykin which Dr. Small considers a distinct species, but which Watson (*l. c.* 274) made a variety of *T. recurvatum*?

5. T. LANCEOLATUM Boykin ex Watson in Proc. Amer. Acad. xiv. 274 (1879); Small, *l. c.*

T. recurvatum Beck, var. (?) *lanceolatum* Watson, *l. c.* 273.

Specimens which I have seen from Kentucky (*Short*), Georgia (*Torrey*), and others, favour Dr. Small's view, that this is a distinct species. The plants have sessile lanceolate leaves, narrower than in *T. recurvatum*, and narrower petals.

ii. *Species with stalked flowers. Stigmas sessile.*

Trillium erectum series (Spp. 6–9).

6. T. ERECTUM L. Sp. Pl. 341 (1753); Watson in Proc. Amer. Acad. xiv. 274 (1879), in part.

T. rhomboideum Mich. Fl. Bor. Am. 215 (1803), excl. var. *grandiflorum*.

T. fœtidum Salisb. Parad. Lond. t. 35 (1806).

T. pendulum Willd. Hort. Berol. t. 35 (1816).

Linnæus's description runs, "Trillium flore pedunculato erecto," with these citations:—

Paris foliis ternis, flore pedunculato erecto. *Amœn. acad. i. p. 154.*

Solanum triphyllum brasilianum. *Bauh. pin. 167*; *prodr. 91; Burs. ix. 12.*

Solanum triphyllum canadense. *Corn. canad. 166, t. 167* [should be "t. on p. 167"].

Solano congener tryphyllum canadense. *Moris. hist. 3, p. 532, § 13, t. 3, f. 7.*

Habitat in Virginia.

The reference Amœn. acad. i. p. 154 is to an annotated list of the plants in the herbarium of Joachim Burser by one Roland Martin. The plant in question, of which a description is given, was received by Burser from a certain French doctor returning from Toupinambault, Brasil; Burser sent a duplicate to Caspar Bauhin, who describes the plant in his Prodr. 91 (1620) as *Solanum tryphyllum Brasilianum*, saying, "hoc in sylvosis Brasiliæ apud Tououpinambaultios copiose reperitur, referente Pharmacopæo Gallo, qui una cum aliis D. Bursero communicavit"; the sepals are 3 in. long, petals 2 in. The author in his Amœn. cites also *Solanum triphyllum canadense*. Corn. canad. 166.

Linnæus's fourth citation, *Solano congener triphyllum Canadense* Moris. hist. 3, p. 532, § 13, t. 3, f. 7, is the same plant as Cornuti's, which is moreover cited as a synonym.

The plant in Linnæus's herbarium under this name is a specimen of *Medeola virginica* L. received from Kalm.

In the absence of Burser's specimens, we are referred back to Cornuti's figure and description to determine what Linnæus meant by his species; this is evidently what is generally understood as *T. erectum*.

The specimens show considerable variation in the size and breadth of the leaves, size of the flowers, colour, relative size and breadth of petals, absolute and relative length of stamens and stigmas, and relative length of anther and filament.

We can distinguish—

(1) A smaller less robust form with rhombic, shortly acuminate leaves, flowers small to moderate, stamens barely or not much longer than the short recurved stigmas, and filaments three-fifths to four-fifths the length of the anthers. The petals may be white or claret, and are ovate, blunt, and slightly to about one-third longer than the sepals. The stamens are 6–10 mm. long, the stigmas 2–4 mm.

I have seen specimens from Canada, New York, Vermont, Massachusetts, and Tennessee (Smoky Mts. *Pinus canadensis* region, Rugel). Some of the Tennessee specimens have very small leaves and flowers (sepals 12 mm., petals 14 mm., and stamens 6 mm. long).

T. pendulum Willd. *l. c.* must be included here.

(2) A robust form with large broadly rhombic shortly acuminate leaves, large flowers, anthers more than twice to many times as long as the filaments, and falling short of the tips of the long stout outwardly curving stigmas. The petals may be white or claret; they are elliptic or ovate, obtuse to subobtuse, and about equal in length to the sepals. The stamens are 1–2 cm. long, the filaments 2·5–5 mm., the anthers 8–18 mm.; the connective is generally just prolonged above the anther-cells; the stigmas from 5 to 10 mm. long.

We have specimens collected in Canada by Masson (1799–1802) with sepals and petals 4 cm. long, and from several of the North-eastern United States (Ohio, Kentucky, Illinois).

The specimen which Bauhin had from Burser, purporting to come from Brazil, may belong to this form; it is described as having leaves 4 in. broad and 5 in. long, "ex rotunditate acuminata," sepals 3 in. long, petals white, 2 in. long by 1 in. broad.

(3) Var. *viridiflorum* Hook. Bot. Mag. 3250, nearly allied to (2), but characterized by its rather broadly ovate greenish petals.

I have received a cultivated specimen from Mr. G. F. Wilson, of Weybridge, queried "*T. canadense*," which, I think, represents this variety; it has filaments five-sevenths to five-eighths the length of the anthers, while the figure in the Bot. Mag. represents the filaments about half the length of the anthers.

7. T. VASEYI Harbison in Biltmore Bot. Studies, i. 24 (1901). I had separated as a very distinct form plants collected by Rugel in the Smoky Mountains, Tennessee, which are evidently identical with the plants recently described under the above name, "from the high mountains of the Southern Alleghanies." They have a robust stem, ovately-rhomboid leaves, large ovate purple petals, and long slender anthers much exceeding the very short recurved stigmas.

8. T. CAMTSCHATICUM Pallas in herb.; Pursh. Fl. Am. Sept. 246 (1814). *T. obovatum* Pursh, *l. c.* 245, as regards the specimens of Pallas.

We have several sheets of this plant in Pallas's herbarium in the National Collection; a stout horizontal rhizome bears the stiff straw-like remains of numerous withered peduncles surrounded by the deeper brown scarious sheaths. The functional peduncles are glabrous, 23-35 cm. long, and barely reach 4 mm. in diameter.

Leaves rhombeo-rotundate, often with somewhat flattened base, apex subacuminate (5–10 cm. long and nearly or quite as broad, sometimes slightly broader than long); pedicel 1·5–6 cm. long, erect or curving above. Sepals oblong-elliptical to oblong-ovate, 2–3·5 cm. long; petals longer than the sepals, elliptical to ovate or subobovate, blunt, pale-coloured, 2·5–nearly 4 cm. by 1·3–2·2 cm.; stamens 12–17 mm.; anthers three or more times as long as the filament, not very much exceeding the short stigmas (3-5 mm.); ovary pyramidal.

I have also seen the following specimens:—

Kamschatka. Cook's third voyage; ad portum St. Petri & Pauli, Lütk.; Wright; Adoltz.

Korea. Bushell in Herb. Hance, no. 918.

Amur. Maximowicz. *Sachalin*, Glehn.

Japan. Hakodate, Maximowicz.

We have no Canadian specimens of this form; compared with our American specimens it comes nearest *T. Vaseyi* Harbison, but the latter is distinguished by its relatively longer stamens and shorter stigmas.

9. T. TSCHONOSKII Maxim. in Mélang. Biolog. xi. 863 (1883).

Generally robust plants with leaves ovately rhombic to rotund rhombic and shortly acuminate, generally large in proportion to the small flowers; sepals and petals subequal; stamens short, filament and anther subequal, anthers about on a level with the very short thick recurving stigmas. Berry succulent, globose, filled with subreniform reddish brown seeds.

Stem variable in length and thickness, 13–40 cm. by 3–8 mm. maximum thickness; leaves sessile to subsessile, 7–16 cm. long by 5·3–15 cm. broad; pedicel erect in flower and fruit, barely

1–3·5 cm. long. Sepals lanceolate to narrowly ovate, subacute to acute, 1·2–2·6 cm. long by 6–8 mm. broad; petals lanceolate to rotund-ovate or -obovate, blunt, slightly shorter, subequal to, or slightly longer than the sepals, white or purple, sometimes more or less reduced in size or absent (*T. Smallii* Maxim.). Stamens half or less than half the length of the petals (6–10 mm. long), connective often shortly produced above the anther-cells; stigmas 2 mm. long; ovary pyramidal, longitudinally winged. Berry ·8–2 cm. in diameter; seeds 2 mm. long.

This approaches nearest to form (1) of *T. erectum*, which resembles it in the small flowers, approach to equality between filament and anther, short stigma, and relative length of stamens and stigmas. The Asiatic specimens are generally much more robust, with larger generally relatively broader leaves, and are characterized by subequality between the petals and sepals and the filaments and anthers. The petals are also more delicate in texture.

T. Smallii Maxim. (*l. c.* p. 862) seems to be a form having a varying and unequal amount of reduction in the size of the petals, which may even be altogether absent.

I have seen the following specimens:—

Himalaya. Sikkim, 10,000 ft. (*Gamble*, no. 643, and *Pantling* in herb. Clarke, no. 46652); Bhotan (*Griffith*, no. 5601).

China. Hupeh (*Henry*, no. 6067 & 6067 B); West Szechuen and Tibetan frontier (*Pratt*, no. 840); Szechwan, Mt. Omei, 8000 ft. (*Faber*, no. 980).

Japan. Hakodate (*Maximowicz*); Nippon, Nikko (*Tschonoski*, *Bisset*); Nagasaki (*Maximowicz*); Hakone (*Bisset*); Chinsenji (*Bisset*); Miogisan (*Bisset*); Fujisan (*Bisset*); Central Mts., 2–7000 ft. (*Maries*).

10. T. GRANDIFLORUM Salisb. Parad. t. 1 (1805); Watson in Proc. Amer. Acad. xiv. 274 (1879).

T. rhomboideum var. *grandiflorum* Mich. Fl. Bor. Amer. i. 216 (1803).

We have no specimen from Salisbury, but among his drawings, where also fragments of plants from which the sketches were made are sometimes found, I find the originals of the dissections for the plate in the *Paradisus*. There is evidence that the dissections on the plates were generally copied from Salisbury's drawings, though no intimation of this is given in the work. The plate is such an excellent representation of the species, that there is no question as to identity.

Specimens show considerable variation in size of leaves and flowers, length of pedicel, &c. The large petals are generally obovate or oblanceolate, sometimes tending to broadly elliptical; they are blunt, and longer than the sepals. The narrow filaments are rather shorter than the linear anthers (from five-eighths to six-sevenths of their length), and the anthers exceed the slender erect or somewhat spreading stigmas, the latter, generally between 4 mm. and 6 mm. long, but sometimes reaching 1 cm., are occasionally coherent for a very short distance at the base. I find, as Salisbury states, that the ovary is obviously unilocular, the three placentas being sessile on the ovary-wall, and not, as usual in the genus, projecting more or less nearly to the centre of the chamber. The artist in the *Paradisus* has not drawn the placentas, though they are indicated in Salisbury's original sketch.

Mr. T. Smith, of Newry, who has kindly sent me living specimens of nearly all the cultivated species, tells me that "there are two forms of *T. grandiflorum*, one which grows in bogs and one on dry soil," and says that "we generally have to lose them in order to find out which is which." I have not had the opportunity of comparing these two forms.

A specimen in Herb. Kew. from Goat Island, Nicaragua, has leaves with a stalk 1 cm. long; and there is also a monstrous form from Syracuse, New York (from herb. Gray), with leaf-stalks as much as 3 cm. long.

11. T. OVATUM Pursh, Fl. Amer. Sept. i. 245 (1814); Watson, *l. c.*
T. californicum Kellog in Proc. Calif. Acad. ii. (1863), 50, fig. 2.
T. grandiflorum Hook. Flor. Bor. Am. ii. 180, in part, *i. e.* as regards the Columbia locality.
T. obovatum Hook. *l. c.* non Pursh.

The western representative of *T. grandiflorum*, from which it is distinguished by its generally narrower and *lanceolate* petals. The flowers are on an average smaller, but considerable variations in size occur. Watson says (Proc. Amer. Acad. xiv. 274), "stigmas somewhat stouter and more recurved," but in my limited experience I do not find this a general character.

It is often difficult to distinguish *T. ovatum* from *T. grandiflorum* in the herbarium. Mr. Smith, however, says that in the garden this difficulty does not exist, as *T. ovatum* "opens its flowers first, and immediately after emerging from the ground, and before the leaves have developed, the stem afterwards lengthening until the flower dies off purple, while *T. grandiflorum* grows to its full height before the flower shows at all."

Note.—In *Erythea*, vii. 104 (1899), Mr. C. V. Piper describes a new western species, *T. crassifolium*, allied to *T. ovatum*, but differing "in its erect rhizomes, shorter petals, and thickish differently shaped leaves." The petals are 2–2·5 cm. long, white or pinkish in colour, broadly to rather narrowly lanceolate, acuminate or acute, and *scarcely as long as* the narrowly or broadly lanceolate acute sepals. The locality is "on damp hillsides, foothills near Wenatchee."

12. **T. Rugelii**, sp. nov. Herba robusta glabra, foliis late rhomboideis subsessilibus breviter acuminatis; flore pedunculato e foliorum medio cernuo; sepalis patentibus lanceolatis obtusis; petalis patentibus rotunde-ovatis, sepalis subæquilongis; antheris linearibus quam filamenta plus triplo longioribus, et stigmata crassa brevia et recurvata valde excedentibus, ovario sphærico sex-sulcato.

A fine plant springing from an apparently horizontal rootstock. Stem pale brown, very wrinkled and somewhat straw-like when dry, 40 cm. long by 5–6 mm. thick above the base, becoming much slenderer in the upper third. Leaves 12–13 cm. long and as broad, the three main veins well-marked on the under face. Peduncle 4–6 cm. long. Sepals 18–22 mm. long by 8–10 mm. broad; petals about as long as the sepals, but twice as broad, colourless in the dried specimen; filaments 2·5 mm.; anthers 8 mm. long, deep purple; ovary and stigmas deep purple, the former 5 mm. long, the latter 4 mm.

A distinct-looking plant, near *T. cernuum* and *T. erectum*. It is distinguished from the former by its large broadly rhomboid leaves, proportionately small flowers with almost rounded petals, and anthers exceeding the short recurved stigmas; and from the latter, to which it is perhaps more nearly allied, from the shape of its leaves and characters of stamens and pistil, it differs in its nodding flowers and subrotund petals.

Hab. On the mountains at Broad River, North Carolina; *Rugel*, March, 1841. Specimens in Herb. Mus. Brit.

13. T. CERNUUM L. Sp. Pl. 339 (1753). Trillium flore pedunculato cernuo. With the following citations:—

Paris foliis ternis, flore pedunculato nutante. *Cold. noveb. 81.*

Solanum triphyllum, flore hexapetalo carneo. *Catesb. carol. i. p. 45.*

Habitat in Carolina.

The plant in Linnæus's herbarium was received from Kalm. It has very shortly-stalked rhombic-ovate shortly acuminate leaves 8–8·5 cm. long by 6–6·5 cm. broad, and a strongly recurved flower with lanceolate acute sepals barely 2 cm. long by ·6 cm. broad, colourless petals slightly longer and about as broad, and stamens with linear oblong anthers shorter than the three distinct thick spreading stigmas.

We have in the Department of Botany a very similar specimen received from Chelsea Garden in 1758, and also several plants in herb. Miller closely agreeing with the Linnean specimen. The latter are authentic for the *Dictionary of Gardening*, where (ed. viii. 1768) Miller says his plants of *T. cernuum* were sent him from Philadelphia by Dr. Bensel, who found it growing in plenty there. He also says the petals are whitish green on the outside and purple within; no trace of colour is left in the petals of the specimen, but the anthers are still reddish. We have also a specimen from John Bartram, and numerous other specimens from Canada and the North Atlantic States.

Pursh's idea of *T. cernuum* was similar, judging from plants from his herbarium which I saw in Herb. Kew.

As regards the two citations which Linnæus adds to his brief diagnosis, the first refers to the list of plants observed in the province of New York in 1742 by Cadwallader Colden, described by himself and sent to Gronovius and by him to Linnæus, who obtained the author's permission to publish the descriptions (Act. Upsal. 1743, 81). I have not seen Colden's specimen; he describes the flower as "rubro-purpureus."

The second citation, that to Catesby's Carolina, i. 45, refers to the next species, *T. Catesbæi* Ell. Bot. S. Carol. i. 429.

Note.—*T. erectum* var. *declinatum* A. Gray, Bot. North U. S.

(ed. v.) 523 (1878). This variety is omitted from the sixth edition of Gray's Manual (edited by Watson & Coulter), and Watson makes no reference to it in his review of the North American *Liliaceæ* (in Proc. Am. Acad. xiv. 274), though, according to Macoun (Catalogue of Canadian Plants, ii. 49), he there included it under *T. cernuum*. Macoun, however, states that Watson considered it a form of *T. erectum*, and in deference to him places it under that species in his Catalogue, but he is himself of opinion that it is either a distinct species or the western and northern form of *T. cernuum*. He says that when fresh the two forms are very distinct, and they differ also in habitat; *T. cernuum* moreover is scented, the variety scentless. It is evidently a case where observation in the field or of a large suite of carefully dried specimens is necessary. The Canadian plant as sent from Macoun from Lake Superior is, I think, without doubt of *cernuum* affinity: in fact, I find nothing to separate it even varietally.

iii. *Species with stigmas springing from a definite style.*

14. T. Catesbæi Ell. Bot. S. Carol. i. 429 (1817).

Solanum triphyllum; flore hexapetalo, carneo. Catesb. Carol. i. 45, t. 45 (1771).

T. cernuum L. Sp. Pl. 339 in part, that is, as regards the Carolina plant; Mich. Fl. Bor. Am. i. 216 (1803).

T. stylosum Nutt. Gen. N. Amer. Pl. i. 239 (1818); Watson in Proc. Amer. Acad. xiv. 275.

In the absence of the specimens which Elliott had before him, Catesby's figure (which he cites) is the only authority for this species. Elliott remarks on the minute agreement of his specimens, collected in the locality mentioned by Catesby, with Catesby's figure, and on the unfair criticism of the latter by Sir James Smith as quoted by Pursh. Smith, in his *Spicilegium* 4, under *T. cernuum* L., says: "Icon Catesbæana tam informis, atque colore tam erronea est, ut eam ad nostram speciem pertinere, nisi herbarium auctoris in Museo Britannico inspexissem, minime crediderim; rara pulchraque hæc planta meliorem sane postulat." Smith's criticism recoils on himself; Catesby's plant, which is still in the British Museum, is quite well represented by the figure in the Carolina book; it is, however, a distinct species from *T. cernuum* L., of which latter Smith's figure (t. 4) is a good representation.

As noted under *T. cernuum*, the two species have been confused; but *T. Catesbæi* is readily distinguished by its curved undulate petals much larger than the narrow sepals, and the long slender anthers much exceeding the stigmas, which moreover unite below into a distinct style. There seems no doubt from the descriptions that this is the *T. cernuum* L. of Michaux, Fl. Bor. Am. i. 216, and the *T. stylosum* Nutt. Gen. N. Amer. Pl. i. 239; a miserable little specimen of *T. stylosum* from Nuttall in Herb. Kew. also favours this view.

Watson (*l. c.* p. 275) prefers Nuttall's name, quoting *T. Catesbæi* Ell. as a synonym. This would be correct if the date on Elliott's title-page referred to the whole work, and not, as is the case, to the last portion only.

We have a good series of specimens collected by Rugel in North Carolina, which show considerable variation in the size of the flower.

Watson (*l. c.*) considers *T. nervosum* Ell. as identical with *T. Catesbæi* Ell., and from Elliott's description this may well be the case. There is in Herb. Kew. a specimen from Elliott labelled "*T. nervosum* nobis," which, I think, is not *T. Catesbæi.* It is a poor specimen with a slender stem 7·5 cm. long, rather narrowly ovate shortly-stalked leaves 5–5·5 cm. long by 2·5 cm. broad, and a flower on an ascending peduncle 11 mm. long, with narrow sepals 16 mm. long, and larger (badly preserved) petals; there is but one flower, and the stamens are almost and the pistil quite concealed by the perianth-leaves; the anthers are apparently straight, and longer than the stigmas. It may perhaps be *T. erythrocarpum* Mich.

15. **T. affine**, sp. nov. Herba caule elato glabro, foliis obovato-rhomboideis subsessilibus, apice breviter acuminatis; flore pedunculato e foliorum medio cernuo; sepalis patentibus oblongo-lanceolatis, abrupte subacutis; petalis sepala paullo excedentibus ad apicem et basin angustatis; antheris linearibus quam filamenta tenuia vix duplo longioribus, stigmata paullo excedentibus; ovario subgloboso sex-angulato, stigmatibus subelongatis apice recurvatis, in stylum breve basi coalitis.

Rhizome absent, stem over 30 cm. long, reaching 3·5 mm. greatest diameter in the lower part. Leaves 10–11 cm. long by 8–8·5 cm. broad. Peduncle 2·5 cm. long, Sepals 2 cm. long by 8–9 mm. broad; petals 3 cm. long by 13 mm. broad, colourless in the specimen; filaments about 4 mm. long, anthers about 7 mm.; ovary barely 5 mm. long, style 1 mm., stigmas 5 mm. Staminal filaments colourless, anthers and pistil purple.

Resembles *T. Catesbæi* in having a definite style, but differs in its broader sepals, smaller not undulate petals, shorter stamens, and leaves broader above the middle. The size and habit of leaf and flower recall *T. cernuum*, from which, however, it is at once distinguished by its longer stamens exceeding the stigmas, and the union of the latter at the base.

Hab. Georgia; *Rugel.* Specimen in Herb. Mus. Brit.

16. T. PUSILLUM Mich. Fl. Amer. i. 215 (1803); Watson, *l. c.* 275. *T. pumilum* Pursh, Fl. Amer. Sept. i. 245 (1814).

Watson places this next to *T. stylosum* Nutt. as a doubtful species, known only from the description. Michaux's plant is represented by a single specimen in his herbarium, now at Paris. The locality which he cites is "Pine-woods of Lower Carolina." We have in the National Herbarium, in herb. Gronovius, Clayton's Virginia plant no. 536 (Gronov. Fl. Virgin. 1743, p. 157), on which Asa Gray has written "cf. T. pumilum Mich." A similar plant occurs in Linnæus's herbarium, written up by Linnæus "*T. sessile*" (a species of which there is no representative), and on the back of his sheet in the same hand "Trillium 1; Tradescantiæ affinis, fl. odorato unico tripetalo, radice tuberosa Clayt.," that is to say, an abbreviation of the description of Clayton's plant. Sir J. E. Smith has written "prob. *T. pusillum* Mich.," and in Rees's *Encyclopædia* refers this plant to *T. pumilum* Pursh. I made a careful sketch and description of the Linnean specimens, and asked M. Poisson, of the Paris Herbarium, to compare them with Michaux's material. He replied: "Le *Trillium pusillum* est representé par un seul échantillon dans l'herbier Michaux. Quant à l'identification, c'est absolument la même chose que votre croquis. Vous êtes donc absolument dans la vérité en identifiant les deux plantes."

There are two specimens on the sheet in Linnæus's herbarium. The larger has a slender stalk 14·5 cm. long, and barely exceeding 1 mm. in greatest width. The three leaves are oval to lanceolate, subsessile, 4·2 cm. long by 1·2–1·4 cm. broad. The flower has a short erect pedicel 6 mm. long, oblong lanceolate sepals 2 cm. long by 5–6 mm. broad, and very delicate lanceolate slightly shorter petals; the stamens and pistil are completely hidden. The smaller has a stalk just over 10 cm. long by 1 mm. thick, lanceolate leaves about 3 cm. long by 8·5 mm. broad, and an almost sessile flower with sepals 1·3 cm. by barely 3 mm., and petals 1·4 cm. long; part of the anthers are visible, and correspond with those in Clayton's specimens.

Clayton's plants, of which there are three, have a slender stalk 15–20 cm. long by 1 mm. or less in thickness. As stated by Gronovius (*l. c.* 157), one plant, which I have figured, has a rhizome; the portion remaining is horizontal, 12 mm. long by 4 mm. thick, bearing thin membranous sheaths, while the stalk is also sheathed at the base for about 12 mm. The leaves are sessile, lanceolate, blunt, and 3-nerved, 2·6–3 cm. long by 9–11 mm. broad. The flowers are sessile and erect, the sepals bluntly lanceolate, 1·5 cm. long by nearly 5 mm. broad, the petals barely 1·5 cm. by 4 mm., lanceolate and subacute; the stamens 7–8 mm. long, with the filament barely as long as the twisted anther, above which the connective is not prolonged; the ovary bears six longitudinal ridges, and is 2·5 mm. long; there is a style 2 mm. long, bearing three slender suberect stigmas (a little over 3 mm. long), which reach about the same level as the tops of the anthers.

It is, as Watson suggested, near *T. Catesbæi* Ell. (*T. stylosum* Nutt.), from which it is distinguished by its smaller erect sessile or very shortly stalked flowers. The same author points out that the *T. texanum* Buckl., from N.E. Texas, known only from the description (in Proc. Acad. Nat. Sci. Philad. 1860, 443) is apparently synonymous; the flower-stalk is, however, longer (6 lines), while the flowers are smaller (sepals 6 lines long by 2 lines wide).

Explanation of Plate 426.

A. *Trillium pusillum* Mich., plant in herb. Gronovius, nat. size.—1. Stamen, × 2. 2. Pistil, × 2.

B. *T. Rugeli* Rendle, nat. size.—3. Stamen, × 2.

LIMOSELLA AQUATICA L. var. TENUIFOLIA Hook. f.

By W. P. Hiern, M.A.

(Plate 426 C.)

An interesting form of Mudwort was collected last June and July at Kenfig Pool, Glamorganshire, by the Rev. E. S. Marshall and Mr. W. A. Shoolbred, each of whom is of opinion that it is a species abundantly distinct from *Limosella aquatica* L. This opinion accords with the views taken by many botanists, as appears from the synonymy; but, on the other hand, the matured judgement of other botanists, and a comparison of specimens in our larger herbaria, lead to the conclusion that the form ought to be considered a mere variety. The chief points of difference that are alleged to characterize it are two: first, the cæspitose habit, with complete absence of stolons; and, secondly, the subulate shape of the leaves, without any dilated blade.

The presence or absence of runners cannot be used as a character for this or other allied forms, since both states occur in all of them, and, in fact, some of our specimens are stoloniferous; also the breadth of the leaf-blade is so variable, and specimens show such a close gradation down to its total evanescence, that it is quite impracticable to employ its absence, either with or without other characters, for a serviceable diagnosis.

The name and synonymy of the plant are as follows:—

Limosella aquatica L. Sp. Pl. p. 631 (1753), var. *tenuifolia* Hook. f. Fl. Antarct. ii. p. 334 (1846?); Reichenb. Ic. Fl. Germ. xx. p. 54, t. mdccxxii. fig. ii. and iii. (1862).

- *L. tenuifolia* Wolf ex Hoffm. Deutschl. Fl. ed. 2, i. ii. p. 29 (1804)?; Nuttall in Journ. Acad. Nat. Sc. Philad. i. 1, No. 6 (Oct. 1817), p. 115.
- *L. diandra* Krocker, Fl. Siles. ii. p. 406 (1790), partly; non L. (1771).
- *L. australis* R. Br. Prodr. Fl. Nov. Holl. p. 443 (1810), partly.
- *L. aquatica β biflora* Wahlenb. Fl. Lapp. p. 171 (1812), partly.
- *L. subulata* Ives in Trans. Med.-Phys. Soc. New York, p. 440 (1817).
- *L. aquatica β diandra* Hartm. Handl. Skand. Fl. p. 241 (1820), partly.
- *L. borealis* Lessing, Reise Norw. p. 299 (1831), partly.
- *L. aquatica* var. *minor* Hartm. Handl. Skand. Fl. ed. 3, p. 146 (1838), partly.
- *L. aquatica* var. *borealis* Hartm. *l. c.* ed. 9, p. 56 (1864), partly.

Sir Joseph Hooker, *l. c.*, adds the following note:—"I am convinced there is no specific distinctness between the *Limosella aquatica* L. and *L. tenuifolia* Nutt., and have consequently united them. In the specimens from the southern hemisphere which I have examined, the leaves do not attain the breadth which those of the northern temperate regions generally present; though, on the other hand, both European, Asiatic, and North American plants of the *L. aquatica* have the foliage narrow as that of *L. tenuifolia*, to which variety some arctic individuals of *L. aquatica* are quite similar."

The following description is taken from the specimens collected at Penfig Pool:—

An annual herb, small, densely cæspitose, usually without runners, but in some cases stoloniferous, acaulescent, erect, rather glossy, glabrous, inconspicuously and minutely sessile-glandular, 1·5–5 cm. high, palustral or aquatic; root-fibres numerous, branched, limp, intricate, compressed, very slender, whitish; leaves all radical, numerous or several, crowded, imbricate at the base, linear-filiform, subterete, somewhat compressed, firmly and slightly fleshy, succulent, grass-green or towards the base pallid, gradually or scarcely tapering-subulate towards the obtuse apex from the subscariously somewhat dilated and clasping base, without expanded blade above, entire, 1·2–5 cm. long, erect or suberect, or the outer ones somewhat diverging; stipules 0; scapes several or few, often fewer than the leaves, arising from the axils or inner faces of the leaf-bases, erect or suberect in flower, filiform, terete, firmly and slightly fleshy, grass-green, 1-flowered, shorter than the leaves, ·6–2·5 cm. long, nearly straight or gently curved or in fruit more or less strongly curved downwards; bracts 0; flowers about 2·5 mm. long, erect, ebracteolate; calyx oblong-campanulate in flower, somewhat funnel-shaped at the base, shortly toothed at the apex, transparent, subscarious, longitudinally but not strongly 5-nerved or -ribbed, persistent, subhemispherical in fruit, 1·5–1·7 mm. long or in fruit a little more; the teeth shortly triangular, apiculate, 5 or occasionally 4 suberect, the sinus between the two uppermost of the five less deep than between the rest; the veins or ribs greenish; corolla membranous, transparent, marcescent, pearly white or greyish; the tube campanulate-oblong, rather exceeding the calyx, 1·7–2 mm. long; the limb spreading, very nearly regular, 5-partite, about 3 mm. in diameter; the segments ovate-oval, rounded or obtuse at the apex, approximate at the base, imbricate in the bud, shorter than the calyx, about 1 mm. long; stamens 4, didynamous, glabrous; the filaments rather short, filiform, inserted on the upper part of the corolla-tube; anthers 4, small, rounded, by confluence of the cells unilocular, rounded, approximating about the mouth of the corolla; anther-walls transparent, thin, minutely stellate-marked; pollen spheroidal, smooth, marked with 2 meridional lines; disk 0; ovary small, roundly oval, a little narrowed at the base, compressed, superior, sessile, unilocular or imperfectly 2-celled; ovules numerous, inserted on the central fleshy placenta; style rather short, filiform, 1–1·5 mm. long, glabrous, included, somewhat curved or straight, oblique, apical, slightly excentric; stigma small, capitate, bilobulate, papillose; capsule subglobose or spheroidal, a little compressed, 1·7–3 mm. in diameter, smooth, at length bursting the calyx, bivalved; seeds rather numerous, irregularly and obliquely oblong, longitudinally ribbed and furrowed, very delicately scored crosswise, about ·6 mm. long, dusky yellowish; the ribs and furrows few; the transverse scores numerous; testa subcrustaceous, not thick; albumen white, firmly fleshy, not thick; embryo straight, axile, oblong, white, about ·4 mm. long, terete; the cotyledons rather shorter than the radicle.

This narrow-leaved variety is very widely diffused; specimens in our herbaria are extant from the following countries:—Scandinavia, Germany, Austria, Russia in Asia, island of Fernando Po, the Coast, Kalahari, and eastern regions of the Cape Flora, Madagascar, New Zealand, Tasmania, Australia, Falkland Islands, Nova Scotia, the United States of North America, Columbia, Bolivia, Ecuador, Argentina, Chili, and Patagonia,

There are specimens in the Sloane herbarium, vol. xii. fol. 46, in the National Herbarium, gathered at Dr. Uvedale's, Hampton Court, by Sir Hans Sloane, the name of which is given as *Ranunculus palustris foliis tum graminosis tum rotundis*, &c.; the specimens show both the small ordinary form of *Limosella aquatica* L. and the *tenuifolia* variety without stolons.

The plate of *Limosella aquatica* in *English Botany*, t. 357 (Nov. 1st, 1796), was drawn by Sowerby from a specimen sent to him from Bedfordshire, July 16th, 1795, by the Rev. C. Abbot; it is instructive to note that accompanying this specimen there are others sent by Abbot with it, in Sowerby's herbarium, now in the National Herbarium, which show a gradation of form down to and including the *tenuifolia* variety.

The division of the genus *Limosella* into species is exceedingly difficult, on account of the numerous connecting forms; the following key is an attempt to differentiate what might be regarded as species, if only inconveniently cross and intermediate specimens are ignored:—

- Corolla exserted beyond the calyx; flowers more or less stalked.
  - Corolla-lobes shorter than the calyx.
    - Calyx not strongly nerved.
      - Leaves subterete or narrowly linear, without dilated blade.
        - Scapes or peduncles shorter than the leaves 1. *L. subulata* Ives (1817).
        - Scapes or peduncles equalling the leaves 2. *L. tenuifolia* Hoffm. (1804).
      - Leaves furnished with dilated blade.
        - Leaf-blade either very narrow or at the base obtuse, 2–20 mm. long 3. *L. aquatica* L. (1753).
        - Leaf-blade not very narrow, attenuate at the base, 12–40 mm. long 4. *L. maior* Diels (1898).
    - Calyx strongly 5-nerved 5. *L. longiflora* O. Kuntze (1898).
  - Corolla-lobes equalling or exceeding the calyx.
    - Corolla-limb 4–6 mm. in diameter; leaf-blade 2–16 mm. long . . . 6. *L. capensis* Thunb. (1800).
    - Corolla-limb 8–12 mm. in diameter; leaf-blade 6–44 mm. long . . . 7. *L. grandiflora* Benth. (1847).
- Corolla included within the calyx; flowers sessile 8. *L. Curdieana* F. Muell. (1875).

The most distinct of these is the last, *L. Curdieana*, which is Australian; those numbered 4–7 are, so far as known, exclusively African; Nos. 1 and 3 are very widely distributed, but No. 3, *L. aquatica*, in the restricted sense, appears to be rare in South Africa; No. 2 refers to a North Bohemian plant, of which I have not seen the type, and which perhaps it is not worth trying to distinguish from No. 1, *L. subulata* Ives, the form principally considered in this article.

In some forms of *L. aquatica* the stem is developed so as to produce on it alternate leaves and axillary flowers; these forms have been called var. *caulescens* Koch in Röhling's *Deutschlands Flora*, iv. p. 425 (1833); corresponding caulescent forms occur also on some of the African species.

The figure (Plate 426 C) was taken from one of the young June specimens, and scarcely represents the mature plant in a satisfactory manner. Fig. 4 represents a detached flower magnified six diameters, and shows the pistil seen through the transparent floral envelopes.

BRYOLOGICAL NOTES.*

By Ernest S. Salmon, F.L.S.

(15) Philocrya Hagen & Jensen.

In 1898, in Meddel. om Grönland, xv. p. 388, Hagen and Jensen described and figured a moss from Greenland, under the name of *Philocrya aspera*, as the type of a new genus of *Polytrichaceæ*. The following generic characters are given:—"Folia rigida, brunneo-fusca; costa angusta; alis laminæ non lamelligeris, juxta costam bi- deinde unistratis, ad margines bi- tristratis." The authors add the remark: "Multis dubiis versati genus hoc novum ad plantam perfecte sterilem instituimus. Sed characteres a foliis allati ita sunt graves, ut, etiamsi fructus essent cogniti, tamen nullo cum familiæ genere conjungi posset. A *Polytricho*, *Polytrichadelpho*, *Pogonato* enim longe distat costa angusta, ea tantum lamellosa, et structura alarum foliorum; ab *Oligotricho*, *Psilopilo*, *Catharinea*, non minus distinctum est et habitu eximie polytrichaceo et alis majore parte bi- vel tristratis." In 1900, in Journ. Linn. Soc. Lond. (Bot.) xxxiv. 464, pl. 17, f. 20, I made some notes on the *Atrichum Lescurii* of James (Bull. Torr. Bot. Club, vi. p. 33 (1875))—*Oligotrichum Lescurii* Mitten—and remarked: "The generic position of *O. Lescurii* still remains, perhaps, a little doubtful." After describing and figuring the leaf-structure, I added: "This type of leaf is anomalous for both *Atrichum* and *Oligotrichum*, and is most nearly approached in certain species of *Polytrichum*, from which genus, however, the glabrous calyptra and the position and structure of the lamellæ separate the present plant."

---

* Continued from Revue Bryolog. 1900, pp. 59, 80, 85; and 1901, p. 51.

On sending a copy of my paper to Dr. Hagen, he at once wrote to me that the leaf-structure of *Oligotrichum Lescurii*, as shown in my figure, exhibited the generic characters of *Philocrya*, and suggested that *O. Lescurii* ought to be transferred to *Philocrya*. Dr. Hagen kindly sent me a small fragment of *Philocrya aspera* (now in the Kew Herbarium), so that I have been able to compare the structure of the leaves in the two plants. In *P. aspera* we find that, as stated by Hagen and Jensen, the lamellæ are confined to the nerve, and that, proceeding towards the margin, we come to a bistratose lamina, with projecting cells on the ventral surface; then, usually, there are a few rows unistratose, ending in a single bistratose row of marginal cells. This is essentially the same structure as is found in *O. Lescurii* (see Journ. Linn. Soc. *l.c.* f. 20), although in *Philocrya aspera* the following minor differences are to be noted: the nerve is more widened and flattened, plane and not convex on the ventral surface, and bears a greater number of lamellæ (about thirty-two); the ventral cells of the bistratose part of the lamina (especially towards the nerve) are slightly larger in proportion to the size of the dorsal cells, and project more. (These projecting cells are perhaps to be considered as rudimentary lamellæ, like the projecting cells occasionally present on the nerve in *Polytrichum gymnophyllum* Mitt. (*l.c.* p. 461, f. 19). In this connection it is interesting to note that Hagen and Jensen figure one of these projecting cells in *Philocrya aspera* growing out and becoming divided off to form another cell, so that the leaf there bears, practically, a low lamella.)

The true affinity of *Philocrya*, however, I have been able to discover by a fortunate coincidence. In examining a few mosses lately brought back from China by Dr. A. Henry, I found amongst them a Polytrichoid moss with one old capsule. From the examination of this capsule I found that the moss belonged to *Lyellia*, and a comparison with Indian specimens of *Lyellia crispa* R. Br. showed that the Chinese plant was that species. A detailed examination of the leaf of *L. crispa*, however, showed exactly the same structure as that of *Philocrya*, as can be seen by referring to fig. 14 on Plate 426, which shows part of a transverse section of a leaf from Dr. Henry's Chinese example of *Lyellia crispa*. The specimen of "*Philocrya aspera*" sent to me by Dr. Hagen consists of only a small fragment, and in the absence of fuller material it is difficult to decide whether "*Philocrya aspera*" has been founded on merely barren *Lyellia crispa*, or whether the Greenland moss forms a new species of the genus. I am inclined to the former view, as in the shape and areolation of the leaf, and in the position and structure of the lamellæ, no difference can be found in the two plants. However this may prove to be, it is clear that the genus *Philocrya* must be sunk in *Lyellia*.

The "minute pores" described by Robert Brown (Trans. Linn. Soc. xii. p. 564) at the base of the capsule of *Lyellia crispa*, and conjectured by him to assist in the dissemination of the spores, are in reality very large stomata (with the guard-cells measuring as much as 100 μ in length). These stomata agree in shape and structure with those found on the capsules of species of *Polytrichum*.

A few words are necessary on the question of the position of "*Oligotrichum Lescurii*." When making my observations, above referred to, on this species, I overlooked the fact that Kindberg, in his paper "The European and North American *Polytrichaceæ*" (Rev. Bryol. 1894, pp. 33, 35) had created a new genus for its reception. This new genus—*Bartramiopsis*—is defined as follows: "Leaves not lamelliferous at the back, flaccid, more or less crisped when dry, long-ciliate near the sheathing base; lamellæ few, serrate. Capsule without angles and apophysis; teeth, lid, and calyptra unknown." Kindberg curiously overlooked the fact that James, in his original description (Bull. Torr. Bot. Club, vi. 33 (1875)) of the moss in question as *Atrichum Lescurii*, says, "a loose calyptra of the genus was found"; and Mitten also (Trans. Linn. Soc. 2nd ser. Bot. iii. 191 (1891)) has described the calyptra as "small, smooth, and shining."

Kindberg gives no account of the leaf-structure. Now, as mentioned above, the leaf-structure of "*O. Lescurii*" agrees with that found in the genus *Lyellia*, and the habit also quite agrees with that of *L. crispa*. *Lyellia* as a genus is characterized by the gymnostomous capsule, and the fact that the present plant was originally described by James as belonging to *Atrichum*, and was transferred later by Mitten to *Oligotrichum*—both genera with peristomate capsules—might lead one to suppose that there was no very close affinity between "*O. Lescurii*" and *Lyellia*. On looking into the matter, however, it appears otherwise. In the first place, it is to be noted that the peristome of *O. Lescurii* has never been described; James (*l. c.*) says, "peristome and operculum wanting;" and Mitten, when transferring the plant to *Oligotrichum*, does not mention the peristome. Through the kindness of Mr. Mitten, I have been able to see fruiting examples of "*O. Lescurii*" from Nantaizan, Japan (coll. Bisset). In the two fruiting stems sent, the capsule appears to me to be truly gymnostomous, as the epiphragm is attached directly to the edge of the mouth of the capsule. In all characters, therefore—habit, leaf-structure, gymnostomous capsule, and glabrous calyptra—the present species agrees with *Lyellia*, and consequently should bear the name LYELLIA LESCURII (James).

THE TEACHING OF BOTANY.

AT the meeting of the British Association at Glasgow on Sept. 16, the Botany and Educational Science Sections met for a joint discussion on the teaching of Botany, under the chairmanship of Prof. Bayley Balfour. We extract the following account of the discussion from the *Standard* of Sept. 17th:—

The discussion was opened by Mr. Harold Wager, who, as one of His Majesty's Inspectors of Secondary Schools, has had considerable experience of the teaching of Science in Secondary

Schools. He invited discussion on the comparative educational value, and as a training in scientific method, of botany and chemistry and physics. He recommended the intelligent apprehension of a few truths rather than an ill-digested mass of facts. He thought that the subject of experimental plant physiology was especially useful in a school course, formed an excellent training in observation, experimental manipulation, and the proper discrimination of evidence. As to the proper method of teaching botany, he recommended that the pupil should be led through his own observations and experiments to arrive at his own conclusions. Pupils (he quoted from Herbert Spencer) should be told as little as possible.

Before Mr. Wager's paper was thrown open to discussion, Prof. F. O. Bower also read a paper on the teaching of Botany in the Universities. He deprecated all microscopic work in schools. He protested, also, against the teaching of so-called elementary biology as an introduction to the study of botany. As early as possible in his studies the student should be left entirely to himself, his object being not so much to acquire information as to inculcate a scientific method. The trend of the subsequent discussion was such as to confirm the view of the openers in the importance which they attached to the teaching of botany to the youngest children. All were practically unanimous on this point.

Prof. Miall gave an account of the method followed in the Yorkshire College. It was indispensable, he said, that the students should begin by seeing, after which they should be dealt with in the class-room. With a new class he began in the laboratory, the demonstrator directing attention to the points to be observed, and abstaining from giving any information. Nothing would induce him to go back to the lecturing system, which, as far as he was concerned, stood finally condemned.

Prof. Marshall Ward said that the teaching in school and university must be progressive. The object of the teaching of science was to show the student by research, and, in course of time, to convince him, that it was one of the noblest things he could be engaged in. At the very outset the botanical student should be taught to think and speculate for himself, and to check his speculations and form his conclusions.

Prof. Withers said that it was the collective method of teaching in schools which made botany so difficult a subject to handle practically in the school-room. Prof. Armstrong approved of the abolition of the class-room. Whatever lecturing was necessary should be done in the laboratory. Dr. D. H. Scott thought that botany had been regarded too much from the point of view of the specialist. Miss Clarke gave an account of the botanical work done in the James Alleyn School for Girls, Dulwich, under the Technical Board of the London County Council. Dr. Kimmins supported the suggestion that there should be a Special Committee of the British Association to inquire into the teaching of botany. Prof. Scott Elliott said that most of the discussion had proceeded on the technical side of botany and not on its practical side. Sir

John Gorst, in the course of a brief address, referred to the importance of teaching botany both in rural and urban schools, and said he hoped that in the case of the former the County Councils would give the necessary assistance. He hoped that attention would be directed to the importance of equipping the teachers for the work. Prof. Hartog spoke of the advantage of systematic botany for very young children.

SHORT NOTES.

Mosses new to Ireland. — The following rare mosses have recently been collected in Ireland for the first time, and have not, so far as I am aware, been recorded:—*Campylopus Shawii* Wils. Near Glengarriffe, Co. Cork, 1896; *Rev. C. H. Binstead.*—*C. Schimperi* Wils. By the side of the stream, at 1400 ft., in Derrymore Glen, near Cahir Conree Mtn., Co. Kerry, April, 1899, *Rev. H. W. Lett & D. McArdle.* — *Dicranum uncinatum* C. M. On rock-faces, at 1200 ft., by the sides of two streamlets on the south-east face of Nephin Mtn., Co. Mayo, May, 1901; *Rev. H. W. Lett & D. McArdle.* The following have each been found for the second time in Ireland:—*Campylopus subulatus* Schimp. (Cromagloun, Killarney, Co. Kerry; *Schimper & Wilson,* 1865. Braith. Brit. Moss Flora, i. p. 131), near Glengarriffe, Co. Cork, 1900; *Rev. C. H. Binstead & Dr. Braithwaite.* — *Hypnum fluviatile* Swartz. (Ballinhassig, Co. Cork; *Dr. T. Taylor* in Mackay's *Flora Hibernica,* part ii. p. 38), on rocks in Bann River at Corbet Mills, two miles east of Bannbridge, Co. Down, July, 1900; *Revs. H. W. Lett & C. H. Waddell.*—*H. dilatatum* Wils. (Torc Waterfall, Killarney, Co. Kerry, 1865; *Capt. Hutton,* Braith. *Brit. Moss Flora,* vol. iii. p. 57.) Connor Hill Pass, near Dingle, Co. Kerry, 1897; *Rev. H. W. Lett & D. McArdle.*—H. W. Lett.

Spiranthes Romanzoffiana in Antrim. — On July 30th, when collecting fresh-water algæ between Antrim and Toome, I noticed a single specimen of an orchid which at once arrested my attention as I had not seen it alive before; it was *Spiranthes Romanzoffiana.* I at once proceeded to search for more, and found it to be fairly frequent in wet sandy land. I believe it has already been recorded for Armagh and Londonderry, in addition to its original station in the south-west. Careful examination of other parts of Ireland may extend its distribution. I enclose a specimen for the Herbarium.—W. West.

Euphrasia Scottica. — In 1884, while working at the Flora of Wensleydale, North Yorks, I met with a slender, tall-growing *Euphrasia,* which I distributed under the name *E. gracilis* Fries. Quite recently the plant was examined by Mr. F. Townsend in Mr. Whitwell's herbarium, and pronounced by the former to be *Euphrasia Scottica* Wettstein (= *E. paludosa* Towns.). A week or two ago I made a search for the plant in the old locality near Carperby, Wensleydale, and found the plant in some abundance.

It grows near a mountain tarn at an elevation of about 1000 ft.—JOHN PERCIVAL.

"NAMAQUALAND."—In No. 465 (p. 301) Mr. Spencer le M. Moore describes a new *Blepharis* (*extenuata*), and gives as locality "Namaqualand." Now there are two Namaqualands—a *Great Namaqualand*, belonging to the Germans, and a *Little Namaqualand*, making a part of the Cape Colony. Which one is now meant? I am sure that Mr. Moore means Little Namaqualand, but I am also sure that after forty or fifty years it will be difficult for a botanist to guess it; perhaps, if he does not know very much about botanical investigation of South Africa, will never guess it. In the last number of the Bot. Mag. Sir Joseph Hooker also speaks of a plant found in Namaqualand; Harvey and Sonder already did so, and I am sorry to say the continuation of the Cape Flora makes the same fault. Could you not take notice of this in one of the next numbers of your Journal? Further: Nama*qua* is wrong; it ought to be written Nama, as I have shown many years ago in Petermann's *Geographischen Mitteilungen*. The geographical notes in the *Flora Capensis* and in the *Flora of Tropical Africa* show a great many inexactnesses; one of them, a little one, I quote above. HANS SCHINZ.

[Prof. Schinz is correct in supposing that the locality for *Blepharis extenuata* is in Little Namaqualand.—ED. JOURN. BOT.]

BRECON AND CARMARTHEN PLANTS.—On a walk taken on 15th July this year from the Carmarthenshire Fan (county 44) past the Brecknockshire Fan (county 42) into the Upper Tawe Valley, I came across the following plants of interest:—*Galium boreale* L. (44,* 42), *Sedum roseum* Scop. (44,* 42), *Silene maritima* With. (44,* 42)—very abundant on rocks of the red sandstone from 1500 to 1800 ft. The *Sedum*, especially, was a remarkable feature of the vegetation, growing as thickly as on *e. g.* the cliffs of Ben Lawers: it is given doubtfully by Watson for Brecon. *Asplenium viride* Huds. (44*), in small quantity on the red sandstone; *Thymus Chamædrys* Fr. (44*). In the lake at the foot of the cliffs of the Carmarthenshire Fan (Llyn-y-Fan Fach) I found *Nitella opaca* Agardh (44*); *Littorella juncea* Berg. (44,* 42*); *Isoetes lacustris* L. (44,* 42*); *Sparganium minimum* Fr. (44*); *Ranunculus peltatus* Schrank (44*). A few days previously I had met with *Crepis paludosa* Moench in 42* on the River Perddyn (Neath Valley). The *Isoetes* is certainly *I. lacustris* L. This species, which Watson refuses for 41 Glamorgan on the evidence available, occurs in a lake situated in exactly similar position to that of the Llyn-y-Fan Fach in Carmarthenshire; this lake (Llyn Fach) is at 1500 ft. elevation at the foot of a broken cliff overlooking the Vale of Neath. I am distributing vouchers this year for Glamorgan through the Bot. Exch. Club, together with exemplars of one or two of the Carmarthenshire species mentioned above. *Littorella* and *Isoetes* no doubt occur elsewhere in Breconshire. I have found the former in Llyn-y-Cwm Llwch, at the foot of the Brecknock Beacons. This year, on 15th July, I found both species cast up at the edge of Llyn-y-Fan Fawr, at the foot of the Brecknockshire Fan. This lake has the reputation of being void of both weeds and fish. But I do not see how the *Isoetes* and *Littorella* could have been there—the *Isoetes* in good condition, though small—cast up on the shore, *unless they had come from the lake.* The other lake, Llyn-y-Fan Fach, is some miles away for the pedestrian: there are two great cliffs interposed, as the crow flies. The plants could hardly have come from there. It was too late in the evening to examine Llyn-y-Fan Fawr thoroughly, and trace the plants to their home in it: though I hope to do so another time. A fisherman would not consider such small plants to be *weeds:* they would not shelter fish.—H. J. RIDDLESDELL.

---

* Signifies a new county record, judging by the evidence of an unannotated edition of Watson's Top. Bot. ed. 2 (1884), in which, however, the *Characeæ* do not figure.

HELIANTHEMUM VULGARE IN MIDDLESEX.—Mr. Benbow (p. 278) can find no report of the occurrence of *Helianthemum vulgare* in Middlesex prior to his own. He will find records in Watson's Top. Bot. ed. 2, under the plant—"21 Middlesex. Hind"; and (quite generally) in Pryor's *Flora of Hertfordshire*, and Hanbury & Marshall's *Flora of Kent*, p. xxxvii. Trimen & Dyer, *Flora of Middlesex*, mention it as one of the "wants."—H. J. RIDDLESDELL.

WANDSWORTH COMMON CASUALS.—Last winter the "Three Island Pond" on Wandsworth Common was drained and cleaned, and the removed mud and earth were deposited at the nearest corner of the Common, just above the railway. On the waste heap so formed I have this week (Sept. 14) found some large plants of *Panicum Crus-galli* L., and a smaller number of *Setaria glauca* Beauv. Six years ago, the east bank of the railway-cutting was re-made, and the old wooden bridge near the middle of the Common was replaced by a larger one. At each end of the bridge several small spaces were then enclosed and planted with gorse and blackthorn, to reproduce as far as possible some of the fast-disappearing features of the Common. In one of these enclosures, this summer, about a score of plants of *Cnicus setosus* Bess. have appeared; also, in the same and neighbouring spaces, a single specimen each of *Picris echioides* L., *Salvia Verbenaca* L., and *Erigeron canadense* L. Save for the last-named species, which, during 1885 only, grew on a newly laid-out road a furlong from this point, and has this year been found in the station garden-plots equally distant, none of these plants have been previously seen by me on or near the Common, though I—living on its margin—have observed and recorded its flora closely for seventeen seasons. No new soil or bushes have been brought into the enclosures since they were originally made. Just after the reconstruction of the railway bank, a single *Hyoscyamus niger* L. appeared upon it, and flowered, but it was destroyed in the same year. During the present summer, half a dozen or more fine teasels, *Dipsacus sylvestris* Huds., sprang up in the garden of a friend, bordering on the Common: their introduction cannot be accounted for. I never met with the teasel nearer than in a park, lately built on, at Tooting Common. Last year and this—never previously, to my knowledge—*Dianthus deltoides* L. has been gathered on Wandsworth Common: it most likely came with trees, brought from a local nursery-garden, planted for the L. C. C. about ten years ago.—WILLIAM WHITWELL.

YORKSHIRE MOSSES. — It may interest bryologists to know the various habitats in the North in which I have found three mosses, which have hitherto been considered as South of England. The specimens from all the habitats have been kindly verified by Mr. Dixon:—

Eurhynchium speciosum Schimp. Ackworth (v.-c. 65) March, 1898, on side of disused drain, and shaded by grass; Clifton Ings, York (v.-c. 62), April, 1899, on side of clay ditch, and shaded by grass; Ulleskelf (v.-c. 65), May, 1898, on land occasionally inundated by the River Wharfe, and in shade along the field-side of a hedge; Sherburn-in Elmet (v.-c. 64), May, 1900, on side of damp cinder-path, in shade between high walls; on clay side of River Foss, York (v.-c. 62), in shade and often washed by the stream, June, 1900, a very glossy form; Staddlethorpe (v.-c. 65), Feb. 1898, on wet stones by pond, and shaded by willows, a very stoloniferous and dark form.

Amblystegium Juratzkæ Schimp. Staddlethorpe (v.-c. 65), May, 1897, on wet stones, shaded by willows; Sherburn-in-Elmet (v.-c. 64), May, 1898, in quarry; Jackdaw Crag Quarry, Tadcaster (v.-c. 64), June, 1898, on stone in shade, a very robust form; Hammerton (v.-c. 64), Sept. 1897, by River Nidd; Appleton Roebuck (v.-c. 64), May, 1898, on side of clay ditch, in shade; Burton Salmon (v.-c. 65), April, 1897, in magnesian limestone quarry; Naburn (v.-c. 61), Nov. 1899, in shade by water; Lastingham (v.-c. 62), by roadside on side of drain, May, 1899, with leaves very squarrose, and cells a little narrower than usual, but otherwise good *A. Juratzkæ* (Dixon); Huntingdon (v.-c. 62), June, 1900, a marked form, very distinct from *A. serpens* Dixon, on clay side of drain by roadside; Healaugh (v.-c. 64), with leaves more strongly toothed than usual, and leaf acumen almost squarrose (Dixon), a marked form on base of tree by pool, with *Hypnum riparium* var. *longifolium*, Nov. 1896, and July, 1901; United Kilhope and Welhope burns, Wearhead (v.-c. 66), July, 1898, in shade by river-side; Coatham Marshes, on damp, shady ground, along with *Mörckia hibernica*, May, 1901.

Amblystegium Kochii Bruch & Schimp. Driffield (v.-c. 61), July, 1899, both the large form, identical with Sussex specimens, and a smaller form, both growing by side of pool, in shade; Clifton Ings, York (v.-c. 62), July, 1898, on side of clay ditch in shade, a long-stemmed and distant-leaved form; Barkstone (v.-c. 64, *c. fr.*), May, 1898, in shallow magnesian limestone quarry; Jackdaw Crag Quarry, Tadcaster, June, 1898, on damp stone in quarry, a small form; Coatham Marshes (v.-c. 62), on damp ground at the foot of rushes, June, 1901, a small form. The three mosses above agree closely as to their habitats, all delighting in continual damp ground and shade, the latter promoting the former, and all ignoring the nature of the soil or rock on which they grow.—WM. INGHAM.

NOTICES OF BOOKS.

A Flora of Western Middle California. By WILLIS LINN JEPSON, Ph.D., Assistant Professor of Botany in the University of California. Issued April 16, 1901. Encina Publishing Co., Berkeley, California. 8vo, pp. iv, 625. Price $2.50.

THERE have been many American floras of varying degrees of excellence, but it has been reserved for Prof. Jepson to bring out a book admirably adapted for use in the field. Of convenient size for the pocket, printed in small but clear and well arranged type, on thin but not too thin paper, the attractiveness of the volume at once prepossesses us in its favour; and it may well serve as a model to other local floras, which as time goes on will inevitably be required.

A clearly written and modest preface explains the scope and extent of the book and the mode of treatment adopted, which, especially in the prominence given to the results of examination in the field, we would gladly reproduce it in its entirety did space permit; but we must content ourselves with a somewhat lengthy extract in which the author defines his attitude towards the "new species" which have for the last few years abounded in American periodical literature. He writes:—

"As to the recognition of species, that is, the determination of the number of species present in our region and the working out of their relationships, field studies played an important part. In the larger or more variable genera resort was had to the following method: The material of a given genus was segregated into a certain number of forms (regarded as distinct) or varieties of these forms, the judgment passed being in a large measure controlled by field studies. The descriptions of such forms were drawn up from fresh material or herbarium material. The results of these studies could not in all cases, however, be correlated with the existing literature, but to the descriptions such names were applied as were available in the literature and with all care and caution. Therefore, a particular description stands for a natural type (that is to say, the usual or dominating or most marked form), while the name may belong to a form of the species which is unusual or abnormal, or may, indeed, belong to a very different plant since the original description by which such a name was published may be so vague, so loose, or so broad that exact determination is difficult or impossible. Difficulties of this nature may only be settled by a study of the original or type-specimens, but these are, to us, largely inaccessible. Moreover, type-specimens are not infrequently so poor or so fragmentary that nothing can be made of them. It should be understood, therefore, that the author's conception of the species here given place is expressed by the descriptions rather than by the names; that there is here an account of the plants of the region rather than a list of species gleaned from the literature. One other course was open. Instead of presenting a fresh account of the plants known to us as occurring in our region, it would have been quite possible to list the species attributed to middle California and copy the paraphrased descriptions which we have inherited, adding more or less new matter and emending where it seemed necessary. To one, however, whose facilities as to type-specimens are limited but whose advantages as to the living flora are in many ways unlimited, surely there could be but one choice as to what his task should be. Nevertheless, it is not in the least the intention to deny to the literature a debt which is plain, but the obligation to some of the more recent 'systematic' literature must be said to be dubious when one remembers the paucity of monographic work and contrasts the long list of 'new species.' It is not too much to say that a considerable proportion of these 'new species' consists of isolated descriptions, that there is a lack of co-ordination with species already known, and that as to many of them even their nearest relatives are not acknowledged. It has not been possible to investigate all such. Some are obviously to be rejected—in any event they have not been included here by merit of publication merely. Many others, on the contrary, it has been possible to study more or less fully; of these a surprising number reveal most excellent characters which are not in the least suggested in their often unsatisfactory diagnoses."

The region covered by the Flora is defined as "that portion of California lying west of the Sacramento and San Joaquin Rivers, south of the counties of Mendocino, Lake and Colusa and north of the Pajaro River and Pacheco Pass. Very many extra-limital species are described or noticed, however, so that the volume will be almost if not quite as useful as far north as Red Bluff and as far south as Bakersfield." We observe with pleasure that, while local common names are duly noted, the stupid practice of coining "English" names from the Latin binominal has been avoided. This does not, however, apply to the grasses, for the treatment of which Mr. Burtt Davy is responsible.

We are unfortunately unable to apply to Dr. Jepson's descriptions the only satisfactory test—that of use in the field—but they strike us as exceedingly practical and very well done. The arrangement followed is that adopted by Britton and Brown in their *Illustrated Flora*, beginning with Gymnosperms and ending with *Compositæ*. There is, we are glad to note, only one index, which includes genera, species, varieties, synonyms, and vernacular names: there is also a short glossary—in fact, nothing has been neglected which will render the book serviceable in the field. The only point on which it seems to us improvement could be made would be the placing of the generic name at the head of each column of the index; but the mention of so small a detail shows how little we find that calls for criticism.

Illustrations of the Botany of Captain Cook's Voyage Round the World in H.M.S. 'Endeavour' in 1768–71. By the Right Hon. Sir Joseph Banks, Bart., and Dr. Daniel Solander. With Determinations by James Britten, F.L.S. Australian Plants.—Part II. 1901. Large folio, pp. 35–75. Pl. 101–243. London: Longmans.

Some weeks have passed since this second part was issued. It consists of 41 pages of letterpress and 142 plates. The latter, with a single exception, are printed from the plates prepared by Sir Joseph Banks towards the close of the eighteenth century. The exception is a plate of *Myrmecodia Beccarii* Hk. f., reproduced by the late Robert Morgan from the original drawing made in 1773 by J. F. Miller. The first published notice of this remarkable plant of New South Wales was by Sir Joseph Hooker in this Journal for 1868, when it was referred to a Decandollean species. In 1882 Von Mueller referred it to a species of Gaudichaud. It was not till 1886 that Sir Joseph Hooker described a plant collected by Beccari which Mr. Britten has shown to be specifically identical with the New South Wales species. It is a real gain to science to have the careful diagnosis printed which was drawn up by Solander one hundred and thirty years ago, and this accompanied by Miller's drawing.

Everywhere the critical acumen of the editor is apparent. He has done the work as if he loved it, and, indeed, he never works more *con amore* than when he is restoring the credit and vindicating the worth of men who have been by accident or intent more or less overlooked. In his Australian Flora, Mr. Bentham brought together all that was known of the plants of that great continent; but he somehow did scant justice to these earliest explorers of the Australian Flora. The volume before us deals only with the plants that had been engraved more than a century ago; the collections made by Banks and Solander, preserved in the Herbarium of the British Museum, and the systematic descriptions of Solander, also preserved there, are much more extensive than appears in this published work. Nevertheless in this second part nearly half of the species described were not known by Bentham as having been found by Banks and Solander. We may further note the care with which the editor has dealt with the species of *Utricularia* included in this work, and the restoration of earlier published names which he justified in a paper in this Journal for February last.

W. C.

Two American Text-Books.

Practical Text-Book of Plant Physiology. By Daniel Trembly Macdougal, Ph.D., Director of the Laboratories of the New York Botanical Garden. 8vo, pp. 352, tt. 159. Longmans, New York, &c. 1901. Price 7s. 6d.

Methods in Plant Histology. By Charles J. Chamberlain, Ph.D., Instructor in Botany in the University of Chicago. 8vo, pp. 160, tt. 74. The University Press, Chicago. 1901. Price 1.50 dol. net.

In his *Practical Text-Book of Plant Physiology*, Dr. Macdougal has brought together directions for a somewhat exhaustive series of experiments and demonstrations relating to the physiological side of botany. "A discussion of the principles of the subject is interwoven with the directions for practical demonstrations in order to afford means of interpretation of the experimental results secured; such discussion is naturally limited to the statement of prevalent generalizations in greater part; the space at command does not permit a critical presentation of all of the aspects of any part of the subject. The chief purpose of the author is to present practical directions for the demonstration of the principal phenomena of the physiology of the plant, and also details of experimental methods suitable for the exact analyses requisite in research work."

The sentences which we quote from the preface express both the object and method of the work, and at the same time give an idea of the inelegant and often obscure style of writing adopted by the author. Dr. Macdougal holds an important position in perhaps the most important botanic establishment in America, and speaks with authority on matters of plant physiology—a subject to the advancement of which he has contributed by numerous observations. He has moveover been at considerable pains to bring together in the present volume a large, well-arranged, and admirably selected series of experiments, the formation of which must have involved extensive research both literary and practical. And perhaps, as the title of the work is a "*practical* text-book," we must expect a certain brevity and precision affording but little scope for literary excellence. But even at the risk of sacrificing a few of the demonstrations, or increasing the size of the book, it would, we think, have added to its usefulness if the matter had been presented in a more readable form. The practical book should be the companion to the larger manual, where principles are fully discussed; but unfortunately the larger manual—such, for instance, as students of animal physiology have—does not exist for botany, or exists only in part. The attempt to make the practical book serve the double purpose will end in repelling all but the keenest students; and while it may serve to instil a certain amount of mechanical precision, such a work is utterly useless as a means of literary culture. And it is unnecessary to cite names in illustration of the fact that the latter is not incompatible with scientific excellence.

The subject-matter is arranged in fourteen chapters. The earlier deal with the relation of the plant to external forces and conditions, as, for instance, mechanical or chemical forces, gravitation, temperature, or light. In the later chapters the life-processes of the plants—nutrition, respiration, growth, reproduction, &c.—are the subjects for discussion and experiment. A useful appendix supplies tables of measures and various constants. Reference to the text is facilitated by a good index, and to papers dealing more fully with the subjects under discussion, by footnotes at the bottom of the page—a commendable method. In spite of absence of literary excellence, the book will be very useful to the more advanced student of plant physiology.

Mr. Chamberlain's book, which has grown out of a course in histological technique conducted by the author at the University of Chicago, is advertised as "an indispensable book for students of botany." It will at any rate be found a useful addition to the library in the histological laboratory, and a valuable help in the preparation of those elaborate plant-sections, some study of which is essential, if a clear idea of the intimate structure of the cell, the protoplasm, and the various phases of the nucleus is to be obtained.

In the first part of the book the principles involved in the processes of killing, fixing, and staining are discussed, methods are explained in detail, and the preparation and idiosyncrasies of the more important reagents and staining fluids are described.

The second part consists of a series of specific cases illustrating the methods described in the earlier pages. Familiar and commonly studied examples are selected from the important plant groups from Thallophytes upwards, and methods suggested in each case by which the most information may be obtained from the specimens. The subject-matter is illustrated by figures made from preparations obtained by the methods suggested. A. B. R.

*ARTICLES IN JOURNALS.**

Bot. Gazette (20 Aug.). — F. L. Stevens, 'Gametogenesis and fertilization in *Albugo*' (4 pl.).—W. L. Bray, 'Vegetation of Western Texas.'—F. M. Lyon, 'Sporangia and gametophytes of *Selaginella*' (5 pl.). — A. Schneider, 'Function of calcium oxalate crystals in plants.'

Bot. Notiser (häft. 4; 9 Sept.).—G. O. A. Malme, 'Några drag af lafvarnas inbördes kamp för tillvaron.'—B. Jönsson, 'Ytterligne bidrag till kännedomen om masurbildningarne hos Myrtaceerna, särskildt hos slägtet *Eucalyptus.*'—J. Erikson, 'Bidrag till öländska Alfvarets floristik.'

Bot. Zeitung.—Graf zu Solms-Laubach, 'Ueber die in der Oase Biskra und in deren nächster Umgebung wachsenden spiroloben Chenopodeen.'

Bull. de l'Herb. Boissier (31 Aug.). — E. de Wildeman & Th. Durand, 'Plantæ Gilletianæ Congolenses' (concl.). — H. Schinz, 'Beiträge zur Kenntnis der Afrikanischen Flora' (cont.).—L. Radlkofer, 'Ueber zwei Connaraceen.'—F. N. Williams, *Dianthus hazaricus*, sp. n.—G. Hegi, 'Das Obere Tösstal' (cont.).

Bull. Soc. Bot. France (xlvii, no. 9; received 29 Aug.). — L. Legré, *Styrax officinalis* in Provence.— —. Sennen, 'Herborisations aux environs de La Nouvelle (Aude).' — L. Geneau de Lamarlière, 'Contributions à la flore de la Marne.'

Bull. Torrey Bot. Club (21 Aug.). — V. S. White, '*Tylostomaceæ* of N. America' (10 pl.). — F. E. Lloyd, 'Anatomy of *Chrysoma pauciflosculosa.*'—J. K. Small, '*Dasystoma flava* and related species.' R. M. Harper, 'Georgia Plants' (1 pl.).—Anna M. Vail, *Vincetoxicum Wootoni*, sp. n.

Gardeners' Chronicle (Sept.).—U. Dammer, *Neonicholsonia*, gen. nov. (Palmeæ).

Nuovo Giornale Bot. Italiano ("July"; received 14 Sept.).—F. Cavara, 'La vegetazione della Sardegna meridionale.'—L. Vaccari, 'Flora cacuminale della Valle d'Aosta.' — T. De Stefani Perez, 'Entomocecidiologia della Flora Sicula.'—P. Baccarini,

---

* The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

'Sulla vegetazione della Sicilia orientale.'—A. Colozza, 'Anatomia delle Alstroemeriee.' — G. Bargagli-Petrucci, 'Cavità stomatifere del genere *Ficus*.'

Oesterr. Bot. Zeitschrift (Sept.).—K. Genau, 'Ueber die Entwicklung von *Sauromatum guttatum*.'—J. Velenovský, 'Abnormale Blüten der *Forsythia viridissima*.' — E. Hackel, 'Neue Gräser.' — A. Zahlbruckner, 'Vorarbeiten zu einer Flechtenflora Dalmatiens' (concl.). —J. Freyn, 'Plantæ Karoanæ Amuricæ et Zeaënsæ.'—A. v. Hayek, 'Flora von Steiermark' (cont.).

BOOK-NOTES, NEWS, &c.

William Mathews, who died at Tunbridge Wells on the 5th of September, was born at Hagley, near Birmingham, on Sept. 10, 1828. He was educated at King's College, London, and at St. John's College, Cambridge, where he graduated M.A. He then returned to Birmingham and joined the firm of land surveyors of which his father was the head. Mathews took up botany at Cambridge under Babington, whose *Journal* contains numerous references to excursions undertaken in his company. A note on North Wales botany from his pen appeared in the *Phytologist* in 1853, and he contributed various notes to this Journal between 1871 and 1895, the most important being his notes on Worcestershire plants (Journ. Bot. 1884, 38–41) and on *Alchemilla conjuncta* (Id. 1881, 91). He contributed an account of the flora of the Clent Hills to a little book entitled *Clentine Rambles*, published in 1868; and a paper read before the Birmingham Philosophical Society on the Flora of Algeria, considered in relation to the physical history of the Mediterranean region and the supposed submergence of the Sahara—the outcome of Mathews's visit to that country in the autumn of 1876—was printed in its Transactions, and subsequently appeared in book form. His help is acknowledged by Mr. Bagnall in his *Flora of Warwickshire*, and by Edwin Lees, with whom he was intimately acquainted, in the *Botany of Worcestershire;* he presented a collection of Worcestershire plants to Queen's College, Birmingham. Mathews was one of the founders and an early president of the Alpine Club, and did a great deal of work in connection with early mountaineering discovery. He made the first passage of some of the most notable "cols" in the Zermatt district, and was the first to accomplish the ascent of Monte Viso. With two other members of the Alpine Club, he received from Victor Emmanuel the Order of St. Maurice and St. Lazare, in appreciation of his geographical discoveries in the Italian Alps. Mathews was a Fellow of the Geographical Society, and enjoyed the friendship of many eminent men of science, particularly of those interested in alpine research, such as the late Professor Tyndall and Principal James David Forbes. He was a contributor to the first series of *Peaks, Passes, and Glaciers*, edited by John Ball; and he wrote for the *Alpine Journal* interesting papers on hypsometry—the measurement of altitudes by barometrical pressure.

We record with regret the death of William West, who was born at Bradford on the 11th February, 1875, and from his earliest years displayed remarkable precocity. At ten years of age, on his own initiative and without the knowledge of his parents, he sat for examination and won a scholarship at the Bradford Technical College, being one of the youngest students ever thus admitted. Here he received a grounding in elementary science, and at the end of four years he went up to the Royal College of Science in London, where his progress was also remarkable, and he secured the Forbes Medal for botany, being at the head of the College in this subject. At the age of sixteen he won a foundation scholarship at St. John's College, Cambridge; at the end of his second year he took first-class honours in the first part of the Natural Science Tripos. Ill-health prevented his taking the second part of the Tripos in the following year, and he was again ill at the time of the examination at the end of his fourth year of residence in Cambridge. Owing to this, he secured only second-class honours in the second part—no mean achievement, but still a result disappointing to himself. For a time he acted as a science demonstrator at Cambridge, and subsequently was employed for two years (Michaelmas, 1890, to August, 1892) by the Department of Botany of the British Museum in revising and incorporating the Fresh-water Algæ of Hassall's Herbarium, and of numerous published sets. He supplied the Department with many hundreds of microscope-slides of fresh-water Algæ. On the 8th August he left England for India, where he had been appointed as biologist to the Behar Indigo Planters' Association and the Indigo Improvement Syndicate, Mozufferpore, Bengal. After paying short visits to friends at Bombay and Calcutta, Mr. West reached Mozufferpore on August 27th, where he died (from cholera) on the 14th September. From a very early age, under the tuition of his father, he devoted much attention to botany. To this Journal he contributed in 1898, besides other notes, a long paper on Cambridgeshire plants, and in 1899 described (with Dr. Rendle) and figured a new British Fresh-water Alga (*Pithopora Oedogonia* var. *polyspora*), and "Some *Oscillarioideæ* from the Plankton." West was a man of general accomplishments; he was interested in music and the drama, and his friends anticipated for him a brilliant literary career.

The first part of a new German Cryptogamic Flora by Dr. Walter Migula the bacteriologist has been issued, being a continuation of Dr. Thomé's *Flora von Deutschland, Oesterreich und der Schweiz* (Gera: F. von Zezschwitz), a publication in four volumes which appeared twelve years ago, and was notable for the abundance of its coloured illustrations, depicting all the phanerogamic genera of Teutonic Europe, and many of the species. The cryptogamic continuation is planned on similar lines, and will contain 320 coloured and plain lithographic plates, the small size of the plants treated often permitting several figures to be exhibited on one plate. Three volumes will be published, comprising in all forty to forty-five parts, and the parts will be issued at intervals of five weeks at the price of one mark to subscribers. The first part opens with the

Mosses, and, after dealing with their structure and giving directions for their collection, examination, &c., comes to their classification, the system followed being that of Limpricht's *Laubmoose*. A useful key is provided for each genus. In the case of *Sphagnum* the points of the key are illustrated by figures on a special plate. The descriptions of the species and subspecies are short, and probably adequate; and the geographical distribution is made clear. The colouring of the plates is tolerably good, and the work will be a great boon to the inexpert.

A CORRESPONDENT sends us the following extract from an article entitled "A Week's Tramp in the Pennines," contributed by a schoolmaster to the *Boys' Own Paper* (Aug. 17):—"I had promised a London friend I would procure him a few samples of the genus *Erica*. I managed to gather some fine specimens of *E. tetralix*, *E. vagans*, *E. ciliaris* and *E. vulgaris*, which I mounted. . . . I may here observe without any show of egotism that these specimens have been used in class teaching in one of the largest Board schools in London during the past three years." Our correspondent adds: "The above plants are stated to have been gathered near Market Brough; the lists of insects and ferns collected are equally startling. If the other subjects taught in the 'largest Board schools in London' are treated in as original a manner as topographical Botany, the scholars are likely to be led as far astray as the above Heaths, the Maidenhair at Bowes, or the 'Camberwell Beauty' on the fell sides."

A NEW part of the *Flora of Tropical Africa* (vol. viii. part 2), issued last month, contains the *Lemnaceæ*, *Restiaceæ*, *Eriocauleæ*, and conclusion of the *Aroideæ*, by Mr. N. E. Brown; the *Naiadaceæ*, by Mr. Arthur Bennett; the *Alismaceæ*, by Mr. C. H. Wright. The greater portion is occupied by the *Cyperaceæ* (not completed in the part), by Mr. C. B. Clarke. We are glad to learn that the obstacle which has prevented the publication of vol. iv. has been removed, and that that volume is in active progress.

MR. W. H. PEARSON'S *Hepaticæ of the British Isles* is making steady progress; the last part brings the text down to *Cæsia*, and the number of plates to 176. It is much to be regretted that the date of issue of the parts is not printed on the wrapper of each; this is a matter for the publisher rather than the author, but the latter, who must know its importance, ought to see that it is given.

THE *Twelfth Report of the Missouri Botanical Garden* is mainly occupied by a very careful study of "Garden Beans cultivated as Esculents," by Mr. H. C. Irish; this is illustrated by ten excellent plates. The principal paper of strictly botanical interest is that on "Crotons of the United States," by Mr. A. M. Ferguson, to which twenty-seven carefully-executed plates are devoted. A new Agave (*A. Treleasei* Toumey) and a new Palmetto (*Sabal Uresana* Trelease) are described and figured. The get-up of the volume is, as usual, admirable.

THE Kew *Bulletin* has resumed publication, after a lapse of nearly two years. The number for November and December, 1899, contains a title-page to the volume, which bears the figure "1899" in large type and "1901" in small type at the foot. Neither of these dates applies to the volume as a whole, as will be seen from the following list, which, as on previous occasions, we issue for the benefit of those who may want to consult the magazine in the future, and who may be led astray by the dates given in the work itself:—

Dated		Issued	
January and February,	1899.	July,	1899.
March and April	,,	July	,,
May and June	,,	July	,,
July and August	,,	August	,,
September and October	,,	November	,,
November and December	,,	August,	1901.

We have pointed out before that the Stationery Office date on the first page of each number, though more trustworthy than that which appears below the title, cannot be depended upon. This last issue, for example, is dated "10/99"—a fact which makes one wonder why it has been delayed until August, 1901. As, however, a letter written in November, 1899, and a notice of a magazine published in that month, are printed in the number, it would appear that there must be an error in the date.

A later issue of the *Bulletin* contains the numbers for "Jan.–March, 1901"; the Stationery Office date is "12/1900," and it appeared in September. It contains the following note, which is rendered somewhat puzzling by the fact that the volume which "will shortly be issued" has already appeared:—"The extreme pressure of the demands of important Government work has made it necessary to suspend for a time the publication of the Kew Bulletin. It will now be resumed. The volume for 1899 will shortly be issued. That for 1900 is in preparation." This instalment contains an enumeration of the contributors to the Kew Herbarium. The name, country and date of contributors, and a note of the number of specimens, are given, but there is no attempt to convey any further information.

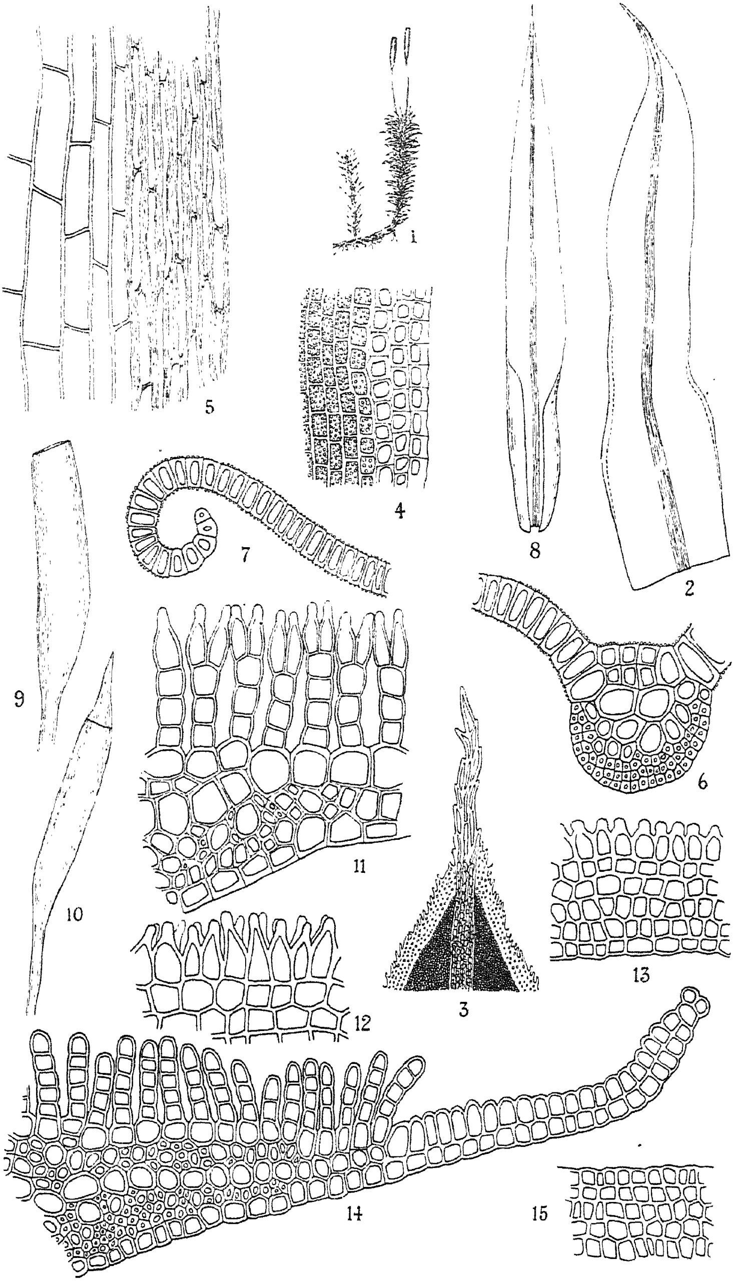
The absence of any popular official guide to Kew Gardens has been to a small extent supplied by private enterprise. A pretty little book, called *Souvenir: Royal Gardens, Kew*, contains some excellent views of the Gardens, and, although evidently undertaken in the interests of advertisers, will no doubt be popular. It is priced at 3d., but may be obtained at Kew for 1d. This, however, does nothing to supply the place of the admirable handbook prepared by Prof. Daniel Oliver, which was last issued in 1885, and has been out of print for years. *Truth* lately reminded us that in 1892 Mr. Plunket, then First Commissioner of Works, stated that the new Guide was almost ready, and they hoped to have it out during the summer.

The Report of the Moss Exchange Club has recently been issued as a pamphlet of about forty pages, and bears evidence of the continued activity and usefulness of the Club, of which there are now thirty-seven members. About 3400 Mosses or Hepatics have been sent in and distributed during the last twelve months, and all of these have been submitted to experts in the several groups, so that the number of errors of naming in the distributed plants was much smaller than in previous years. We notice a great increase in the number of Sphagna sent in, but a considerable falling-off in the number of Hepaticæ. Among the more interesting plants on which notes have been made in the Club note-book, these notes being reproduced in this report, are *Pottia minutula* (a form having a rudimentary peristome); *Thuidium abietinum* B. & S. growing intermixed with *T. delicatulum; Hypnum dilatatum* Schimp. showing a close approach to *H. molle; Weissia calcarea* C. M.; *Amblystegium serpens* B. & S. var. *depauperatum* Boul.; *Porella platyphylla* L.; *Scapania purpurea* Carr.; *Anthoceros punctatus* L.; and numerous Harpidia and Sphagna. The beginners' section has completed its first year, and has now forty-five members. Some of these have displayed much activity and enthusiasm, but many others have apparently done little or nothing except to pay the subscription and accept any plants sent to them.

THE bulky part of the *Journal of the Royal Horticultural Society* issued in August contains many papers of botanical interest:—"Experiments in Hybridization," by Abbot Mendel; "Woad, a prehistoric pigment," by Dr. Plowright; "Hybrid Conifers," by Dr. Masters; "Making and unmaking of flowers," by Prof. Henslow; and "Bulbiform seeds of *Amaryllideæ*," by Dr. Rendle—the last, by permission of the Council of the Society, we propose to reproduce in our next issue. The Journal is so well got up that we regret it should be marred by the introduction of miscellaneous blocks—often unlettered, and in no way connected with the text—as tail-pieces, wherever a vacant space affords an opportunity for their insertion. Such figures are neither ornamental nor useful.

MR. F. N. WILLIAMS announces the continuation of his *Prodromus Floræ Britannicæ*, of which the first fasciculus was reviewed in this Journal for June. The second fasciculus, consisting of sixty-four pages and dealing with the *Compositæ*, is in the press, and will be issued in November at the price of 2s. 2d., free by post to subscribers, who should send that amount to the author, at 181, High Street, Brentford.

MR. A. G. TANSLEY, of University College, believing that "there is room for a new botanical periodical appearing at short intervals and affording a ready means of communication and discussion among British botanists, as well as giving facilities for the quick publication of short papers, whether critical, speculative, or embodying the results of research," has issued a circular giving details of the proposed journal. The scheme is very comprehensive, as it is proposed to "cover the whole range of modern botany" and to include contributions in English, French, and German: "British (or foreign) botanists would, it is hoped, write freely expressing their views or their doubts on all questions connected with the practical advance and teaching of the science, as well as on purely scientific questions."



E. S. Salmon del. West, Newman photo.

Bryological Notes.

BRYOLOGICAL NOTES.

By Ernest S. Salmon, F.L.S.

(Continued from p. 341.)

(Plate 427.)

(16). Tortula prostrata Mont.

In 1842 Schwaegrichen (Sp. Musc. Frond. Suppl. iv. pl. cccx *b*) published the description and figures of a new moss from Chili under the name of *Barbula mnioides*. In 1845 Montagne (in Ann. Sci. Nat. iii. sér. iv. 107) described a moss from Chili under the name of *Tortula* (*Syntrichia*) *prostrata*. In 1849 Müller, in his *Synopsis* (i. 632), placed Montagne's plant as var. *prostrata* under the species *Barbula mnioides* Schwaegr. In 1856 Montagne, describing his plant in Syll. Crypt. 40, gave the synonym "*Barbula mnioides β prostrata* C. Muell.," with the following remark, "Hic adesse confusionem suspicor." In 1879 Mitten (Phil. Trans. Roy. Soc. clxviii. 33) created a new section—*Calyptopogon*—in the genus *Streptopogon* for the reception of *B. mnioides*. In the *Genera Muscorum Frondosorum*, published in 1901, Müller remarked that Mitten was in error in placing *B. mnioides* in the genus *Streptopogon*, as the moss in question was a true *Syntrichia*.

Investigating the point, however, it appears quite clear that Müller, although using the name *B. mnioides* and quoting Schwaegrichen's excellent pl. cccx *b*, has described in the *Synopsis* not that plant, but Montagne's *Barbula prostrata*; consequently his remark, quoted above, on the affinity of "*B. mnioides*" does not apply.

In comparing the description given by Müller with the original one by Schwaegrichen of *B. mnioides*, we notice these points of difference: Müller gives the characters to his plant, "folia caulina recurvo-patula . . . margine revoluta . . ."; the perichætial leaves are described simply as "longiora, erecta"; and the capsule is provided "annulo arcte adhærente latiusculo." In Schwaegrichen's description we find, "folia erecta; folia calycina longissima . . . exteriora tria pedunculo longiora." Schwaegrichen makes no mention of a revolute margin to the leaf, nor to the presence of an annulus, and these two features are not shown in his plate. On the other hand, in *Tortula prostrata* Mont., the leaves are recurved-patulous, the leaf-margin is recurved, and there is a conspicuous persistent annulus. Through the kindness of M. P. Hariot I have been able to examine the type-specimen of Montagne's *T. prostrata*, and at Plate 427 I have given figures of this species. If these are compared with Schwaegrichen's fine plate of his *B. mnioides*, the great difference between the two plants will be at once seen.

The fact that both species come from Chili and have marginate leaves, may have led to their being thus confused. It is possible that we know the very specimens which Müller had before him when describing the "*Barbula mnioides*" of his *Synopsis*. Dr. R. Giessler has been kind enough to send me, from the Botan. Garten, Leipzig, the specimen of "*Barbula mnioides*" in the Herbarium there. On the label of this specimen is written "*Tortula. Barbula mnioides* Schwaegr. Chile. Pöppig m[isit] 5. 1829." The words "*Barbula mnioides* Schwaegr." are without doubt in Müller's handwriting, and the moss, as was found on comparing it with the type, is *Tortula prostrata* Mont., the Leipzig specimens only differing in being a little less robust. In Hampe's herbarium, also, there are two specimens, labelled in Müller's handwriting "*Barbula mnioides* Schwaegr."—from "Chili, Pöppig" and "Valdivia, Chili austral.," both of which are *T. prostrata*. In Bescherelle's herbarium, the moss labelled "*Streptopogon mnioides* Schwgr. Corral—Chili—Krause" proves likewise to be *T. prostrata*.

The following description of *T. prostrata* is drawn up from an examination of Montagne's type in the Paris Museum, except as regards the operculum and peristome, which are absent in these specimens; these parts are therefore described from the Leipzig specimens.

TORTULA (*Syntrichia*) PROSTRATA Mont. in Ann. Sci. Nat. iii. sér. iv. 107 (1845); Mont. in Gay Fl. Chil. vii. 148 (1850); Mont. Syll. Crypt. 40 (1856); Mitt. Musc. Austr. Amer. 172 (1869).

Barbula (*Syntrichia*) *mnioides* C. Müll. (non Schwaegr.) (excl. synon.) et var. *prostrata* C. Müll. Syn. i. 632 (1849).

Streptopogon mnioides (Schwaegr.) Mitt. var. *prostrata* (Mont.), Par. Index Bryolog. (Actes Soc. Linn. Bord. li. 276 (1897)).

Dioica ?, cæspitosa, satis robusta, fusco-viridis, ætate omnino fuscescens; caule prostrato vel ascendente radiculoso sursum ramos erectos ad 2 cm. altos interdum iterum ramosos emittente, foliis caulinis dense confertis patulis vel plus minus squarroso-recurvis siccitate appressis subcontortis 4–5 mill. longis e basi erecta oblonga vaginante 1–1·5 mill. longa in laminam marginatam lingulatam vel oblongo-lanceolatam cuspidato-acuminatam circ. 0·8 mill. latam productis concavis interdum apicem versus cymbiformibus, margine medio utrinque revoluto apice foliorum juniorum tenuiter dentato dentibus senectute fugacibus, nervo valido rufo in cuspidem denticulatam excedente, cellulis in basis vaginantis parte inferiore plus minus hyalinis rectangulis vel elongato-rectangulis parietibus transversis tenuibus longitudinalibus incrassatis plus minus interruptis marginalibus elongatis parietibus incrassatis rufescentibus limbum circ. septem cellulas latum efficientibus, cellulis laminæ subviridibus minutis breviter rectangulis circ. 9–12 × 6–7 μ dense papillosis marginalibus quadratis incrassatis limbum flavum ætate rufescentem tres vel quatuor cellulas latum cum nervo in folii apice confluentem efficientibus, foliis perichætialibus 6–7 mill. longis erectis vel erecto-patentibus anguste lanceolatis superne tubuloso-concavis cæteris foliis caulinis conformibus intimis margine erecto exterioribus margine revoluto, omnibus nervatis, capsula in pedicello erecto 8–12 mill. alto superne sinistrorso cylindracea 4 mill. longa circ. 1 mill. lata (raro 3 mill. × 0·75 mill.) solida badia subinæquali parum curvula, operculo elongato-conico crasso recto, peristomio longo ad tertiam partem tubuloso dentibus purpureis pluries contortis, annulo persistente latiusculo.

Hab. Chile: (Pöppig), Corral (Krause), Valdivia.

Allied to *Barbula robusta* (Hook. & Grev.) Brid., and to *B. serrulata* (Hook. & Grev.) Brid., in both of which species the margin of the leaf, although originally described as "plane," or "erect," is narrowly revolute at about the middle of the leaf, as in the present species.

(17). POGONATUM PAUCIDENS Besch.

In the description (Ann. Sci. Nat. vii. sér. xv. 70 (1892)) which Bescherelle gives of his species, the most important specific characters are those connected with the lamellæ of the leaf, and with the structure of the peristome, *viz.* "lamellis . . . in sectione transversali apice longe bifidis subfimbriatis," and "peristomii dentes 24!" Bescherelle remarks (*l. c.*) of "*P. paucidens*":—"Plante voisine du *P. microstomum* R. Br. de l'Himalaya; en diffère cependant par les capsules papilleuses et le péristome composé de 24 dents seulement." The moss here described by Bescherelle came from China (Yunnan, bois de Ma-eul-chan, à 2800 mètres d'altitude, 9 juillet, 1889 (Delavay, sine num.)). Amongst a few mosses lately brought to Kew from Yunnan by Dr. A. Henry, I found specimens of a *Pogonatum*, which on examination made me suspect the specific distinctness of "*P. paucidens*." These specimens collected by Dr. Henry ("Yunnan, mts. to S.W. of Mengtse, 6000 ft., no. 13,714A," and "Yunnan, mts. to N. of Mengtse, 6000 ft., no. 13,714") showed all the characters described for *P. paucidens*, except that the peristome possessed thirty-two teeth. This led me to compare the type-specimens of *P. paucidens* in Bescherelle's herbarium with the series of *P. microstomum* in the Kew Herbarium, with the result that I find the two to be identical. In the first place, in Bescherelle's own specimens from the type locality, the single capsule which I examined showed thirty teeth, two of which were larger than the rest, and represented, I believe, four teeth confluent in pairs. Further, in another specimen named *P. paucidens* in Bescherelle's handwriting, from "Koua-la-po, Hokin, Yunnan, avril 1885, Delavay, sine numero," the capsule examined had thirty-two teeth. In its peristome, therefore, "*P. paucidens*" agrees with *P. microstomum*, although it sometimes varies in some of the teeth becoming confluent, a fact which doubtless accounts for Bescherelle's description of the peristome. In the second place, the capsule of *P. microstomum*, although described by Schwaegrichen (Suppl. ii. vol. ii. 10, tab. cliv. (1827)) and Bridel (Bryol. Univ. ii. 745 (1827)) as "*lævis*," is really in its upper half "granuloso-papillosa," exactly as in Bescherelle's type-specimens of "*P. paucidens*."

The marginal cells of the lamellæ of the leaf are very characteristic in the present species. Lindberg (Obs. Europ. Polytrichoid.; Notiser pro Fauna et Flora fenn. ix. 98, 1867) gives a good description of them. After placing *P. microstomum* in the section "margo lamellarum, in sectione transversa stamina phanerogamarum haud male æmulantium, a duobus stratis cellularum formatus," Lindberg remarks:—"Lamellæ omnium pulcherrimæ, ut constructæ, quoad marginem, a cellulis geminis, sublagenæformibus et lenissime obliquis, ad basin connatis, ceterum tamen divergentibus et in apice colli angusti bullam minutam globosam et valde incrassatam gerentibus." It is, however, to be noted that some variation occurs in the structure of the margin of the lamella; the marginal cells may be only slightly elongated (fig. 13), or so elongated as to be flask-shaped (fig. 12), and the lamella, sometimes for a considerable distance, bears only a single row of marginal cells (fig. 13 and fig. 11, left-hand lamella) instead of the geminate cells described by Lindberg (figs. 11 and 12).

(18). ANOMODON TOCCOÆ Sulliv. & Lesq.

In Musc. Bor. Amer. no. 240, which appeared in 1856, or a little earlier, Sullivant and Lesquereux published (with a diagnosis) a moss under the name of *Anomodon ? Toccoæ*, from the locality "ad rupes, prope Toccoa Falls, Georgiæ superioris, sterilis." In 1856 Sullivant (Musc. & Hepat. United States, 658 (58)) gave a further description of the plant, adding that perichætia occurred, and remarking as follows:—"In the herbarium of the late Dr. Taylor are specimens marked "*Neckera Nepalensis* T. T. MSS., Nepal, apparently the same as those from Toccoa Falls, with imperfect fruit, like that of *Anomodon attenuatus* Hub." In 1864 *A. Toccoæ* was figured and described (with the same note) in Sulliv. Ic. Musc. 121, tab. 76A. Up to the present time this single locality in Northern Georgia is the only station known for the species in the United States.

In 1859 Mitten (Musc. Ind. Or. 127) published as a new species of *Anomodon* from India and China his *A. devolutus*, with the following diagnosis:—"Ramis pinnatim ramosis devolutis, foliis ovato-lanceolatis apice acuminatis acutis dentatis nervo sub summum apicem evanido. Hujus speciei fragmenta tantum vidi. Statura coloreque plantæ, *A. viticuloso* similis. Habitus, ob ramos circinatos devolutos, singularis."

The authors of *Bryologia Javanica* (ii. 228), in enumerating *A. Toccoæ* Sulliv. & Lesq. from Java, Sumatra, and Celebes, add "*A. devolutus* Mitt.?" In Hampe's herbarium, also, there occurs a specimen labelled "*A. Toccoæ* Sull. & Lesq. Celebes. Lacoste," on which Hampe has written "*devolutus* Mitt."

With the above exceptions, all authors have considered *A. Toccoæ* Sulliv. & Lesq. and *A. devolutus* Mitt. as specifically distinct, the plant from Georgia, U.S.A., and from Java, Sumatra, and Celebes being referred to the former name, and the plant from India, China, and Japan to the latter. Comparison of the example of *A. Toccoæ* issued in Musc. Bor. Amer. no. 240, with Mitten's type of *A. devolutus* shows conclusively, however, that the two are identical.

The fruit of the present species is stated by all authors to be unknown, whereas in reality a good number of capsules are present on the original Indian specimens of *A. devolutus*. In the United States only perichætia have been found; the authors of *Bryolog. Jav.* describe the plant as being, in Java, Sumatra, and Celebes, "ubique sterilis"; there is, however, in Schimper's herbarium, a specimen from Sumatra bearing perichætia. In India, however, fertile plants have been collected from three localities. As mentioned above, fruit occurs on the original specimens collected by Wallich in Nepal. There is a specimen at Kew, labelled "Nepal, Wallich," on which Wilson has written "*Leskea revolubilis* Wils. MSS.," bearing one old capsule. On this specimen Mitten has written *Anomodon devolutus* Mitt. In Wilson's own herbarium we find several specimens from the same locality, with a good number of capsules, mostly old and without peristome, but in one case showing an obliquely rostrate operculum. On these specimens, labelled "Kamoon (Wallich)," which bear, besides *Leskea revolubilis*, the MSS. names *L. gyrata* Wils. and *L. circinata* Wils., we find the following note :—"Peristome double, apparently Leskioid, whitish or pale yellow ; calyptra smooth (dimidiate ?)." The other fruiting examples are in the Kew Herbarium—one from "N.W. Himalaya, Jaunsar district, below Kathyan, 5–6000 ft. Coll. J. F. Duthie, May 17, 1893, no. 12929"; the other from "N.W. India; District Dehra Dun, Sansidhara, 3000 ft., Oct. 1895. Coll. J. F. Duthie." In both specimens the capsules are deoperculate, with the merest trace only of the peristome. The exact structure of the peristome remains therefore unknown, but we can add to the specific diagnosis of *A. Toccoæ* the following fruiting characters :—"Capsula in pedunculo flexuoso inferne purpureo 12–15 mill. longo erecta elliptica vel oblongo-elliptica 2–2·5 mill. longa 0·9–1 mill. lata leptoderma, operculo oblique rostrato."

As regards the distribution of *A. Toccoæ*, it appears that the species is really much more widely spread than the countries mentioned above indicate, and that its true geographical range has been obscured by authors having given the plant different names when growing in different countries. In the first place, however, we may note that the species in Asia has received many MS. names. This is probably due to the fact that *A. Toccoæ* is undoubtedly a variable species as to the slenderness or robustness of its branches. In Bescherelle's herbarium there is a specimen labelled "*Anomodon Toccoæ* Sulliv. & Lesq., Java" (sent by Lacoste). On this Bescherelle has written "*A. devolutus* Mitt.," and also (apparently later) "*A.* (*Herpetineuron*) *rubiginosulus* C. M." This is a small slender state of *A. Toccoæ*, and presents characters which might at first sight cause it to be regarded as distinct. In this Java specimen, and in the Sumatra one in Schimper's herbarium, the leaves are narrower than usual, and are finely and longly acuminate. These characters, however, are found only in the leaves of slender branches; in other specimens from Java and Sumatra the robust stems bear leaves of the shape shown in Sulliv. Ic. Mus. tab. 76A, f. 3. A longer acumination of the leaf-apex is the general rule for leaves towards the base of the branches, and can be seen in the American example (Musc. Bor. Amer. no. 240). Convincing proof that this slender state with narrow finely acuminate leaves really belongs to *A. Toccoæ* is furnished by the Indian specimens collected by Wallich and others. In these we find, among robust branches bearing broad leaves with a triangularly acute apex, other very slender branches with narrow leaves, specially characterized by being finely and longly acuminate (the apex being sometimes almost filiform)—in fact, presenting exactly the same characters as those found in the Java and Sumatra specimens mentioned above. In Hampe's herbarium there occurs a plant labelled "*A. fuscinervis* C. M. MSS. Rajmehal hills, S. of Sahibgunj, c. 500 ft. (S. Kurz). Oct. 1870, no. 2780." On the sheet Hampe has written: "*A. devoluto* Mitt. proximus," and "Ab *A. devoluto* Mitt. differt foliis longioribus acuminatis tenuioribus diaphanis perichætialibus brevioribus cellulis anguste ovalibus magis pellucidis." The plant undoubtedly belongs to *A. Toccoæ* (*A. devolutus*), with which it agrees perfectly in habit, areolation, &c. Another plant in Hampe's herbarium is labelled "*Anomodon Fersmanni.* Java; Mt. Gedi & Salak; misit Fersmann." This name is obviously a slip for "*Teysmanni*"; the plant is *A. Toccoæ.*

Outside its recorded distribution we meet with *A. Toccoæ* under, I believe, three distinct names. The first is *Neckera* (*Papillaria*) *sciuroides* Hampe Enum. Musc. Brasil. 43 (1879) (=*A.* (*Herpetineuron*) *janeirensis* C. M. MSS.) from Brazil, Rio de Janeiro (Glaziou, no. 9222). On this plant Cardot has already remarked (in Paris' Index Bryolog. Suppl. p. 14), "vix ab *A. Toccoæ* differt." These Brazilian examples are mostly flagelliferous (in Hampe's diagnosis the description "ramis siccis teretibus curvatis, sciuroideis, interdum apice filescentibus" is given), the flagellæ in some cases measuring 4 cm. in length. On account of this character it is probable that anyone not having a full series of specimens of *A. Toccoæ* available for comparison might hesitate to regard the Brazilian plant as belonging to that species. With a large number of specimens before one, however, it is at once seen that the occurrence of flagellæ is by no means confined to the Brazilian example of the species; we find the flagelliferous habit as strongly marked in Ceylon specimens, "Central province, 5000 ft. Thwaites, no. 254," where many of the branches run out at the apex into a slender thread-like flagella ½ cm. or more long. The same flagelliferous branches are also to be found in some of the original specimens of "*A. devolutus*" collected by Wallich in Nepal, the flagella often attaining a length of 2 cm. Subflagelliform branches can also be seen in some examples of the American plant (Musc. Bor. Amer. no. 240). In all other characters (habit, areolation, &c.) "*Neckera sciuroides*" agrees perfectly with *A. Toccoæ*, and must, I think, be regarded as identical with that species.

The second name is *Anomodon* (*Herpetineuron*) *flagelligerus*, which has been given by Müller (Nuov. Giorn. Bot. Ital. 1897, p. 273) to a supposed new Chinese moss. The specific diagnosis contains the characters:—"Ramis brevibus usque ad pollicares accedentibus valde flexuosis apice subcircinatis tenuibus plus minus remotis simplicibus, sed ex summitate flagella nonnulla tenerrima viridissima minutifolia exmittentibus." The description concludes with the remark: "Surculo flagellifero ab omnibus congeneribus serratis prima scrutatione distinctissima species." The description of the moss above quoted, together with the other characters given in the diagnosis, made me suspect that Müller was describing merely the flagelliferous state of *A. Toccoæ*, and this supposition was found to be correct on obtaining, through the kindness of Dr. P. Hennings, the loan of the original specimen of "*A. flagelligerus*." This specimen, from "China interior, prov. Schen-si, Sche-kin-tsuen, ad latera montium Tsin-liu; parce inter alios muscos (J. Giraldi, 28 Dec. 1895, Bryotheca E. Levier, 1896, no. 1479)," consists of only a few fragmentary barren stems, and in habit, shape, and areolation of leaf, &c., agrees exactly with slender (often flagelliferous) examples of *A. Toccoæ* from India, Ceylon, Java, Sumatra, and Japan.

Under the third name we find a more remarkable extension of the range of *A. Toccoæ*. In looking through the species of *Anomodon* in the Kew Herbarium, I was struck by the resemblance in habit of an African moss named *A. robustus* Rehm. with that of *A. Toccoæ*, and, after a close comparison of the plants, I have not been able to find any characters by which they can be separated. No description of "*A. robustus*" has apparently been published; the specimens were issued, without a diagnosis, in Rehmann's Musc. Austr.-Afric. nos. 639 and 639 b, from respectively "Natal; in monte Kwatlamba ad Laingsneck (Rehmann)," and "Transvaalia: in umbrosis mont. Kwatlamba supra Lydenburg (leg. MacLea)." These African specimens represent a fairly robust state of *A. Toccoæ*, and in habit and leaf-characters quite agree with the examples collected by Wallich in Nepal, and with specimens from Hongkong.

It appears, therefore, that the synonymy and distribution of the present species are as follows:—

ANOMODON TOCCOÆ Sulliv. & Lesq. Musc. Bor. Amer. no. 240; Sulliv. Musc. Unit. States, 658 (58) (1856); Sulliv. Ic. Musc. 121, tab. 76 A (1864); Lesq. & James, Man. Moss. N. Amer. 306 (1884); Paris, Index Bryolog. (Actes Soc. Linn. Bord. xlvi. 55 (1893)).

A. devolutus Mitt. Musc. Ind. Or. 127 (1859); Paris, Index Bryolog. (*l. c.* 53).

Neckera (*Papillaria*) *sciuroides* Hpe. Enum. Musc. Brasil. 43 (1879); Par. Index Bryolog. (*l. c.* l. 150 (1896)).

Thamnium Toccoæ (Sulliv. & Lesq.), Kindb. Europ. and N. Amer. Bryin. i. 44 (1897).

A. (*Herpetineuron*) *flagelligerus* C. M. Nuov. Giorn. Bot. Ital. n. s. iv. 273 (1897); Par. Index Bryolog. Suppl. 14 (1900) (errore *flagellifrons*).

A. janeirensis C. M. MSS.; Par. Index Bryolog. Suppl. 14 (1900).

A. robustus Rehm. Musc. Austr. Afric. nos. 639, 639 b; Par. Index Bryolog. (Actes Soc. Linn. Bord. xlvi. 55 (1893)).

Neckera nepalense Tayl. MSS. (*fide* Sulliv. & Lesq.).

A. Taylori Sulliv. & Lesq. MSS.

Leskea revolubilis, *L. gyrata*, and *L. circinata* Wils. MSS.

A. fuscinervis C. M. MSS.

A. (*Herpetineuron*) *rubiginosulus* C. M. MSS.

A. Fersmanni [*Teysmanni*] Hpe. MSS.

DISTRIBUTION.—*N. America*: U.S.A.: Northern Georgia, Toccoa Falls (Lesquereux)!

S. America: Brazil, Rio Janeiro (Glaziou, no. 9222)!

Asia: India: Nepal (Wallich), c. fr.!; Khasia, Moflong (Hb. Griffith, no. 3)!; Khasia, Kollong (Herb. Ind. Or. Hook. f. & Thomson)!; Kashmir (Little Thibet), Nubra, alt. 11,000 ft., coll. T. Thomson (Herb. Ind. Or. Hook. f. & Thomson)!; Chota, Nagpore (Ball)!; Binsar, 7–8000 ft. (Strachey)!; Dehra Dun district, Sansidhara, 3000 ft., Oct. 1895 (J. F. Duthie), c. fr.!; N.W. Himalaya, Jaunsar district, below Kathyan, 5–6000 ft., May 17, 1893 (J. F. Duthie, no. 12,929), c. fr.!; Rajmehal hills, S. of Sahibgunj, c. 500 ft. (S. Kurz, Oct. 1870, no. 2780)!.

Ceylon: Central prov. 5000 ft. (Thwaites, no. 254)!.

Sumatra!

Java: Mt. Gedé and Salak (Teysmann)!

Celebes (Lacoste)!

China: City wall, Ningpo (Oldham, June, 1861)!; Hongkong, 1879 and 1889 (C. Ford, nos. 223, 282)!; prov. Schen-si, Schekin-tsuen, ad latera montium Tsin-liu (J. Giraldi, 28 Dec. 1895)!

Japan: (Moseley, 'Challenger' Expedit., April–May, 1875)!; Nagasaki (J. G. Veitch)!; Shikoku & Tosa (Makino) (*fide* Brotherus).

Africa: Natal; in monte Kwatlamba ad Laingsneck (Rehmann)!; Transvaal; in umbrosis mont. Kwatlamba supra Lydenburg (MacLea)!.

(19). ANOMODON TRISTICHUS Schimp. MSS.

Jaeger, Adumbr. ii. 306 (1878); Par. Index bryolog. (Actes Soc. Linn. Bord. xlvi. 55 (1893). — The moss bearing this name in Schimper's herbarium, from "Gröneklоof, Cape of Good Hope," proves, on examination, to be identical with *Triquetrella tristicha* C. M. in Öst. Bot. Zeit. 1897, p. 422 (*Zygodon tristichus* C. M. in Bot. Zeit. 1855, p. 764).

(20). AFRICAN MOSSES.

The following species of mosses have been collected on the Gold Coast by Mr. W. H. Johnson, Curator, Botanic Gardens, Gold Coast; and at Old Calabar by Mr. J. H. Holland, late Curator of the Botanic Gardens, Old Calabar. The specimens are in the Kew Herbarium.

GOLD COAST: *Octoblepharum albidum* Hedw., c. fr., on soil in axils of palm-leaves, swamps near Aburi, Jan. 1901; *Plagiothecium aptychopsis* C. M., c. fr., Aburi, Jan. 1901; *Hookeria* (*Callicostella*) *africana* Mitt., rocks, waterfall, Aburi, Jan. 1901; *Neckera disticha* Hedw., c. fr., on trees in swamps, E. Akim, Dec. 1900; *Ectropothecium* (*Vesicularia*) *oreadelphum* (C. Müll.) Broth., c. fr., swamps, Aburi, Jan. 1901; *Thuidium involvens* (Hedw.) var. *Thomeanum* Broth. (= *T. petradelphus* C. Müll. in sched.), rocks, Aburi, Jan. 1901; *T. gratum* (P. Beauv.) Jaeg. (= *T. micropteris* C. Müll. in Dusén Musc. Afric. nr. 65), c. fr., rocks, Aburi, Jan. 1901; *Thamnium leptopteris* C. Müll., clinging on rocks, M'praesu Hills, 1700 ft., April, 1900; *Syrrhopodon disciformis* Dusén., M'praesu Hills, 1700 ft., April, 1900.

Old Calabar: *Octoblepharum albidum* Hedw., c. fr., on oil palm, May, 1900; *Calymperes* (*Hyophilina*) *megamitrium* C. Müll., c. fr., on oil palm, May, 1900; *Ectropothecium* (*Vesicularia*) *oreadelphum* (C. Müll.) Broth., c. fr., on trees, May, 1900.

Explanation of Plate 427.

Figs. 1–10.—*Tortula* (*Syntrichia*) *prostrata* Mont. 1. Part of plant, about nat. size. 2. Stem-leaf (slightly flattened) × 17. 3. Apex of same × 100. 4. Areolation of same, at one-third from the apex, showing the limb × 270. 5. Marginal areolation of the same, near the base × 170. 6, 7. Transverse section of the same at about the middle, showing the revolute margin × 270. 8. Perichaetial leaf (flattened) × 20. 9, 10. Two capsules × 10.

Figs. 11–13.—*Pogonatum microstomum* R. Br. ex Schwaegr. 11. Transverse section of a leaf, from an Indian specimen, × 270. 12, 13. Marginal cells of lamella, lateral view, × 270—12, from an Indian specimen; 13, from a Chinese specimen.

Figs. 14, 15.—*Lyellia crispa* R. Br. 14. Part of a transverse section of a leaf × 270. 15. Lamella, lateral view × 270.

(In the preceding part of these Notes, p. 340, line 16 from foot, the number of this plate is wrongly given as 426.)

MOENCHIA QUATERNELLA:

its Early History and Geographical Distribution.

By Frederic N. Williams, F.L.S.

The genus *Moenchia* was founded by Ehrhart (Beitr. ii. p. 178 [1787]) in honour of Conrad Mönch, a professor at Marburg, and author of a Flora of Lower Hesse, upon the *Sagina erecta* of Linnæus, which he named *M. quaternella*. The earliest reference to *M. quaternella* is as a British plant by John Ray[*] in 1670, of which he gives the following account:—"Holosteum minimum tetrapetalon, sive Alsine tetrapetalos caryophylloides. *The least Stitchwort.* Radix ei alba, fibris donata. Cauliculi plures semipalmares, tenues, infirmi, rotundi, rubentes, crebris geniculis intercepti. Ad singula genicula apponuntur folia ex adverso bina, caulem fere amplectentia, dimidium vix digitum longa, e basi latiuscula in acutum mucronem sensim desinentia. Flores in summitatibus ramulorum albi, quadrifolii, e calyce quadrifolio, quâ notâ a reliquis hujus generis omnibus satis distinguitur. Vere floret, in glareosis sterilioribus frequens."

In the second edition, to the same description "C" is added in the margin, indicating those plants which are to be found in the neighbourhood of Cambridge; though "the least stitchwort" is not mentioned in Ray's earlier work, *Catalogus Plantarum circa Cantabrigiam*, published anonymously in 1660. Though not definitely mentioned, its implied occurrence in the neighbourhood of Cambridge in 1677 is the first locality-record for the plant. There were, however, two supplements to the Cambridge Catalogue; the first printed in 1663, and the second printed in 1685. It is in this second appendix, as it is called, compiled by John Ray and

---

[*] *Catalogus Plantarum Angliæ*, ed. i. p. 168 (1670); ed. ii. p. 163 (1677).

Peter Dent, that the name of a definite locality for the plant is given for the first time. After the Latin description copied from the earlier work, as given above, the authors state the place where the specimens were found as "nigh that gate of Gamlingay Park which is next the town." This appendix of seventeen leaves is not paged, and the statement occurs on the ninth page after the introductory paragraphs.

The next reference to the plant is by Pierre Magnol.[*] In his small octavo volume, printed at Montpellier, a scarce book, of which few copies exist, it is described under the name of "Alsine verna glabra"; the author being apparently unaware of Ray's previous account of the same plant. Magnol's account is as follows:—"Plantulam inveni circa pratulum luci Gramuntii (in quo copiose crescit gratiola) vere cum flore et seminibus, quæ in quibusdam accedit ad *Alsinem vernam Lugd.* radiculam exilis est, circa quam aliquot foliola angusta, oblonga, glabra oriuntur: cauliculus uncias tres altus, duobus aut tribus articulis distinctus est, binis foliis articulum amplectentibus: ad secundum, vel tertium articulum cauliculus dividitur in duos vel tres, quorum quilibet florem unicum habet foliolis albis constantem, quibus quatuor folia viridia acuta supposita sunt, succedit loculus oblongus minuto semine plenus." While Ray carefully describes the habit of the plant, the characters of the flower and fruit are clearly indicated in Magnol's description. Two years later, in Ray's principal work, the description is repeated,[†] and in an abbreviated form in his subsequent *Synopsis*,[‡] where, for the first time, Magnol's plant is mentioned and identified with the specimens he had previously described. Ray also adds a note as to the plant being easily overlooked, "parvitate sua, quodque cito evanescat; foliis fere caryophylleis, flore tetrapetalo, et florendi tempore facile innotescit."

On p. 1005 of the former work Ray refers to two plants described by Parkinson (1640) under "Lychnis." The first of these appears to me to be identical with the common English form of *Silene gallica*; of the second, Ray says he knows nothing of its occurrence in England, "huic autem ultimæ nihil a nobis simile in Anglia nec visum, nec auditum." In the third volume of Bubani's remarkable *Flora Pyrenæa*, which has just come to hand, this other plant is queried as possibly identical with *Moenchia quaternella*; but as its identity cannot be satisfactorily established, I have not mentioned it at the outset as the earliest reference. Parkinson, in the work cited,[§] describes it under the name of "Lychnis tenuifolia altera," and gives it an English name, "the least wild Campion." The same plants are again mentioned fifteen years afterwards by How,[||] his uncompromising critic, who writes of them, "These two are not spoken of by any other, and grow in divers places in our own land"; and he refers to the second (our supposed plant) as "Lychnis exilis sive tenuifolia altera." Bubani may be right, but Parkinson's description is bald and vague.

---

[*] *Botanicon Monspeliense*, p. 14 (1686).

[†] *Historia Plantarum*, ii. p. 1025 (1688).

[‡] *Synopsis Methodica Stirpium Britannicarum*, ed. i. p. 145 (1690); ed. ii. p. 206 (1696).

[§] *Theatrum Botanicum*, p. 138, n. 9 (1640).

[||] *Stirpium Illustrationes*, p. 98 (1655); a book compiled from Lobel's unpublished manuscripts.

The next fact to note in the history of the species is the definite record of its occurrence on Hampstead Heath, in Middlesex, by J. Petiver* in 1695. In the following year it was recorded in Sicily by Cupani,† and in his posthumous work‡ specimens of *M. quaternella* were for the first time figured, under the name of "Alsine tenuis, Lini foliis, paulo brevioribus, glaucis." A third edition of Ray's *Synopsis* § was undertaken by Dillenius, and published by him in 1724, in which the plant is again figured, though not so well drawn as in Cupani's work; and this is the figure which is cited by Linnæus in his description of *Sagina erecta*.‖ The year after the appearance of Cupani's volume of plates, the plant was figured by Barrelier,¶ under the name of "Chamælinum gramineo seu acuto folio"; and again by Vaillant** in 1727, under Magnol's name of "Alsine verna glabra." Two later references to the plant (both cited by Linnæus) are interesting; one by J. S. Guettard,†† who records it from Étampes, in the department of Seine-et-Oise, and the other by T. F. Dalibard,‡‡ in the neighbourhood of Paris—in both cases referred to under the name of "Sagina scapis unifloris," the latter author simply quoting Guettard's reference. It may be mentioned that Dillenius adds a note, "common in the spring on Blackheath."

Among the many volumes of the Sloane herbarium preserved in the Natural History Museum are to be found six authentic specimens of *M. quaternella*.

(1) In vol. 13, fol. 88, no. 6; a specimen labelled "vero sylvestre," collected near Paris by Moses Charas, from a collection sold by his son to Sloane.

(2) In vol. 56, fol. 110, no. 1; on a sheet containing most of the forms included by Ray in "Alsine," placed side by side for comparison; among the plants given to Sloane by Dr. Paul, probably gathered in the neighbourhood of Montpellier, as Dr. Paul was attached to the faculty of medicine there.

(3) and (4) In vol. 85a, fol. 70, no. 3, and fol. 176, no. 3; specimens gathered by Plukenet.

---

* Gibson's translation of Camden's *Britannia*, 1695 (list of Middlesex plants on pp. 335–340).

† *Hortus Catholicus*, p. 7 (1696).

‡ *Panphyton Siculum*, ii. t. 252 (1713).

§ Page 344, t. 15, f. 4 (1724).

‖ *Species Plantarum*, ed. i. p. 128.

¶ *Pl. Gall. Hispan. Ital. Obs. icon.* t. 1165, f. 2 (ed. *Jussieu*, 1714).

** *Botanicon Parisiense*, p. 6, t. 3, f. 2 (ed. *Boerhave*, 1727).

†† *Observations sur les Plantes*, ii. p. 276 (1747), a work based on unpublished material left by Francois Déscurain (1658–1740).

‡‡ *Floræ Parisiensis Prodromus*, p. 56 (1749); chiefly useful as being a compilation extracted and arranged from three or four larger books which do not seem to be now obtainable.

(5) In vol. 124, fol. 10, no. 31; one of Buddle's specimens.

(6) In vol. 311, fol. 61, no. 1; a specimen from Uvedale's herbarium.

In Ray's European herbarium, which is also kept separate, I was unable to find any specimen of the plant.

In the British Herbarium, the old specimens include one from Sir J. Banks's collection, gathered near Woolwich; a plant from Hyde Park in one of the fascicles issued by J. Dickson (*Hort. Sicc. Britannicum*, 1793–1799); and another gathered by Hugh Davies in the isle of Anglesey (about 1805).

Curtis* gives an excellent figure of the plant, and in his account of it says:—"We meet with it abundantly on most of the heaths about London, particularly on Blackheath. . . . If the season prove dry, as hath been most unusually the case this year, 1779, the stalk is generally simple; but if the ground be moist, it throws out many stalks, which first spread on the earth, and afterwards become upright, as is represented in the middle figure."

Geographical Distribution in Europe.

Moenchia quaternella is met with in all the countries of Western, Southern, and Central Europe, and is absent from the northern and eastern parts of the Continent. It is by no means a common plant; though it occurs, perhaps, more frequently than its records show, for, being an early-flowering annual, it is easily overlooked. After flowering the plant dries up, and becomes even less conspicuous, as Ray pointed out in his first mention of the plant. The distribution has been here worked out from authentic specimens and records, and is more limited than local floras show. Not only has it been confused with *M. octandra*, and eastern varieties of *M. Mantica* been mistaken for it, but its evident introduction in Moldavia, Hungary, and on the coast of Prussia, as well as other places, has been overlooked. The species is found in England, Holland, Belgium, France, Spain, Portugal, Germany, Switzerland, and Italy, and in two provinces of Austria (Küstenland and Bohemia). The European limits are as given below:—

Northern limit, England, 55° 40′.—Specimens in H. C. Watson's herbarium at Kew, from the Spindleston hills in Northumberland, collected by W. Richardson in 1850, and from the basaltic rocks at Howick by G. R. Tate in 1851. Found also on the basalt at Ratchwood, near Belford, and further south in the same county at Embleton (cf. *Baker & Tait*, Fl. Northumberland and Durham [1867], p. 135).

Southern limit, Sicily, 37° 20′.—Todaro's specimens from Valdemone (Pl. Sic. exs. no. 655), and Tornabene's from the base of Mt. Etna, near Catania (Fl. Aetnea, i. [1889], p. 181). The plant occurs also on the Madonie hills in the Palermo district (*Gussone*), and other parts of the island, except in the Syracuse district.

Eastern limit, Prussia, 17°.—At the village of Tarnast, near Breslau, in the province of Silesia. Reported elsewhere in Germany, from Luckau and Jüterbog, in the province of Brandenburg (*Garcke*, Fl. Deutschl. ed. 1895, p. 103); near Leipzig, in Saxony (*Reichenbach*); Osterfeld, in Prussian Saxony (*Schliephacke*).

---

* *Fl. Londinensis*, ed. i. (1779), t. 136 (*Sagina erecta*); ed. ii. vol. i. fasc. 2, t. 12 (*Moenchia glauca*).

Western limit, Portugal, 8° 40′.—Near Oporto (*ex* Boletim d. Soc. Broteriana, 1887); near Coimbra, 1877 (Fl. Lusit. no. 284, *ex* herb. hort. Conimbricensi); Serra da Caveira, above Grandola (*Daveau*, 1880).

In England the plant is found on dry gravelly pastures and commons, fairly well distributed in the south, becoming less frequent towards the north, until in the northern counties it is only met with occasionally in scattered localities. It is not found in Scotland, Ireland, or the Isle of Man. As to altitude, it occurs at the sea-level in Kent, and ascends to 360 metres in the hills of Carnarvonshire. Of the fifty-three English counties, it is now known to occur in forty-one; also in the Channel Isles. In Yorkshire, it grows only on Grimbald's Crag, Knaresborough, and about the Wickersley fly quarries near Rotherham; and has not been reported either from the North or the East Riding. In Cumberland, it is reported from St. Bees and Coulderton in Mr. J. G. Baker's *Flora of English Lake District* (1885); but there is no mention of it in Mr. W. Hodgson's recent *Flora of Cumberland* (1898). In the following twelve counties there are no records of its occurrence:—Westmoreland, Lincoln, Rutland, Huntingdon, Monmouth, Glamorgan, Carmarthen, Pembroke, Cardigan, Brecknock, Merioneth, and Denbigh. In H. C. Watson's herbarium are luxuriant specimens from Moulsey Hurst, in Surrey, collected by himself in 1861, almost of the habit of *M. Mantica.* On the cliffs of Guernsey, Mr. I. H. Burkill, in 1891, found specimens of a dwarf form, of which the flowering stem measures barely two centimetres, with small leaves crowded at the base.

THE BULBIFORM SEEDS OF CERTAIN AMARYLLIDEÆ.

By A. B. Rendle, M.A., D.Sc.

[We are indebted to the Council of the Royal Horticultural Society for permission to reprint the following paper from its *Journal* (vol. xxvi. August, 1901, pp. 89-96), and for the loan of the blocks by which it is illustrated.

Salisbury's drawings, to which reference is made, were presented by Dr. J. E. Gray to the Department of Botany in 1866. They were mounted in six quarto volumes, but were not arranged systematically; this is now being done, in order to render them readily available for reference. They form a very valuable collection, and amply justify Salisbury's reputation for careful and minute research. An account of his MSS. and collections will be found in Gray's preface to Salisbury's fragment *The Genera of Plants*, published in 1866.

The volume of Hermann's drawings, to which Dr. Rendle refers, formed the fifth volume of his Herbarium, and was acquired by Sir Joseph Banks with the four volumes containing plants in 1793. Mr. Boulger, in his interesting sketch of the History of Ceylon Botany appended to Trimen's *Flora of Ceylon*, seems to be unaware that these drawings are in this country. Linnæus (in his preface to *Flora Zeylanica*) thus describes the volume: "Quinta demum tomus, ut præcedentes in forma atlantica, icones circiter 400 novarum plantarum zeylanicarum continebit artificiosa manu delineatas." The drawings are in large part named by Linnæus and annotated by Dryander; three of them are reproduced in *Flora Zeylanica*.—Ed. Journ. Bot.]

Some discussion having arisen as to the true character of these structures and their mode of germination, it seemed worth while to look up the literature of the subject.

Paul Hermann, in his *Horti Academici Lugduno-Batavi Catalogus* (1687), p. 684, mentions them in *Crinum asiaticum* (which he calls "Lilium zeylanicum umbelliferum et bulbiferum"), as "semina fusca angulosa, quæ in bulbos grandescunt, conceptacula disrumpunt et germina protrudunt"; he says that the same "semina bulbacea" are to be observed in other "liliaceous" plants. Hermann's figure is reduced from an excellent drawing (no. 131 in his collection, now in the Department of Botany, British Museum).

A hundred years later, Gaertner, in his *De Fructibus* (i. p. 42, t. xiii.), describes and figures fruits and seeds of *Bulbine asiatica*. There is some doubt as to the plant to which Gaertner refers. The large number of seeds in the ovary-chambers precludes *Crinum asiaticum*, with which *Bulbine asiatica* has been considered synonymous. He states that the numerous flattened triquetrous seeds have a double integument, the outer of which is thick and "coriaceo-spongiosum," and include a fleshy endosperm and monocotyledonous embryo, which very soon grows out into a terete bulb-bearing shoot, so that the ripe capsule is often filled with germinating bulbils instead of seeds.

F. K. Medicus, in his *Pflanzenphysiologie-Abhandlungen* (1803) (ii. p. 127), refers to a tuber-formation in the capsule of *Crinum bracteatum*.

In his *Prodromus* (1810), Robert Brown mentions the bulbiform seeds of *Crinum*, *Amaryllis*, and *Calostemma*, which, he says (p. 297), consist of a fleshy substance, often green outside, of a cellular nature, and without spiral vessels, which, inasmuch as it is organic and grows by intussusception, can hardly be called albumen; within is a monocotyledonous embryo. In a paper on some remarkable deviations from the usual structure of seeds (Trans. Linn. Soc. xii. p. 143), published in 1818, he again refers to them, but says: "On a more careful inspection, of those seeds at least in which the separation precedes the visible formation of the embryo, I now find very distinct spiral vessels—these enter at the umbilicus, ramify in a regular manner in the substance of the fleshy mass, and appear to have a certain relation to the central cavity where the embryo is afterwards formed." But a far more complete account of these structures was given by a former Secretary of our [the Royal Horticultural] Society, Richard Anthony Salisbury. Salisbury's great desire was to publish a *Genera Plantarum*, but the work never appeared. At his death in 1829 he left a large quantity of MSS. and beautifully executed drawings, which are now in the Department of Botany at the British Museum. A fragment of the *Genera* was printed in 1866 ; it comprises a considerable portion of the petaloid monocotyledons. Salisbury subdivides *Amaryllidaceæ*, as we now understand them, into a number of orders, one of which, *Amaryllideæ*[*] (p. 120), is distinguished from all the others by characters of stamens and corolla, and, "what I deem most essential, in the bulbiform fleshy seeds, hitherto accompanied with a solid peduncle; so that when we cannot obtain the former, a tolerably good conjecture of their nature may be formed by the latter. These bulbiform seeds are often whitish or tinged with pink till exposed to the air, when they gradually assume a green hue, sometimes so dark as to be nearly black, but howsoever dark they may be always known by their thick fleshy coat, hitherto in *Amaryllideæ* devoid of albumen ; if only a few in each cell, they are generally large and irregularly shaped, not unlike small Potatos." He criticizes Ker's suggestion as to their being an accidental and alternate mode of fructification, and says: "After a great many enquiries of our nurserymen and gardeners, I do not hesitate to reply, that all those species which have these bulbiform seeds never produce any other sort; neither are they peculiar to *Amaryllideæ*, but occur in the preceding as well as the following orders of *Pancrateæ* and *Strumareæ;* here, however, they begin and terminate for aught I know to the contrary." "With respect to their structure," he says, "many which I first dissected in 1790 at different periods of their growth, from the distinct vessels near their margin left no doubt in my mind that the great mass consisted of a thick fleshy coat." He also criticizes Brown's statement that in some cases the seed separates before the embryo is formed; "many observations, lately repeated out of deference to his authority, convince me that these bulbiform seeds, so far from being detached before their embryo becomes visible, adhere to the dissepiments of the pericarpium till it is not only formed but very often sprouts." The radicular edge of the embryo "is invariably directed towards the micropyle, but when the seed swells to a large size this is removed by dilation of the hilum to a considerable distance from the nourishing duct, being placed at the opposite end of the hilum as in *Leguminosæ;* and by the time many of these seeds are ripe, all traces both of micropyle and hilum, except the cicatrix of the nourishing ducts, nearly vanish; the original disc of the hilum is, however, often concave. After the radicle comes out of the fleshy coat at the micropyle, the facility with which it forces a passage through other substances is astonishing, rarely turning out of its way, but piercing an adjacent seed of the opposite cell in those capsules which do not split, or the membranous coat of the capsule itself [see fig. i.], apparently with as much ease as the lightest earth, and often in a direction contrary to gravitation. Any botanist desirous of seeing this need only to tie a piece of muslin round the capsule of *Amaryllis longifolia* L. a little before it is ripe, and by placing that afterwards in any moist part of the stove, he will soon find the seeds sewed together by their radicles as completely as by a piece of string, see Tab. fig. Before the plumule or first leaf is evolved, an incipient bulb forms at its base, the outer coat of that being part of the cotyledon, to which physical law I know no exception, though the deity has probably ordained that no physical law shall be universal."

---

[*] Comprises *Crinum*, *Ammocharis*, *Buphane*, *Amaryllis*, *Brunsvigia*, *Nerine*, *Lycoris*, *Hessea*, and *Carpolyza*.

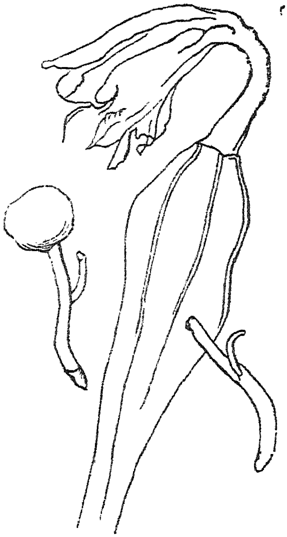


Fig. i.—*Ammocharis falcata* Herb. with a seed germinating in the capsule, April 26, 1814; the capsule was ripe in October, and had stood all winter. To the left, a germinating seed removed from the capsule.
From a drawing by R. A. Salisbury.

The figure to which Salisbury refers, and which was not published, I find among his drawings; it is reproduced in fig. ii.

Although Brown and Salisbury were quite clear as to the true seed-character of these structures, it is evident that some divergence of opinion existed, for in 1824 Achille Richard, in a paper entitled "Observations sur les prétendus *bulbilles* qui se développent dans l'intérieur des capsules de quelques espèces de *Crinum*" (*Annales Sci. Nat.* ii. 12), refers to the great number of authors who have spoken of fleshy bulbils developing in the interior of capsules and replacing the seeds in *Crinum*, *Amaryllis*, &c., and says that, having had the opportunity of observing the pretended bulbils in *Crinum asiaticum*, *erubescens*, and *taitense*, he has assured himself of the error of the above statements. He gives a description (with figs.)

of the structure of the seeds and the early stages of germination. He describes an integument (a sort of brownish epidermis, thick, dry, and peeling irregularly) enclosing a thick cellular endosperm, containing no vessels and becoming greenish towards the exterior, and a small embryo near the base of the endosperm. In germination the radicle makes its way out and grows downwards, soon drawing from the grain the cotyledon, which then elongates.

From the above notes we see that some discrepancy existed in the views held as to the nature of the fleshy substance surrounding the embryo. Brown finds that, in certain cases at any rate, it contains vascular tissue; Salisbury also says that spiral vessels enter at the hilum, but are chiefly distributed along the margin of the fleshy mass, and that the great mass consisted of a thick fleshy coat. Richard, on the other hand, in the species of *Crinum* which he examined, refers the fleshy mass to endosperm.

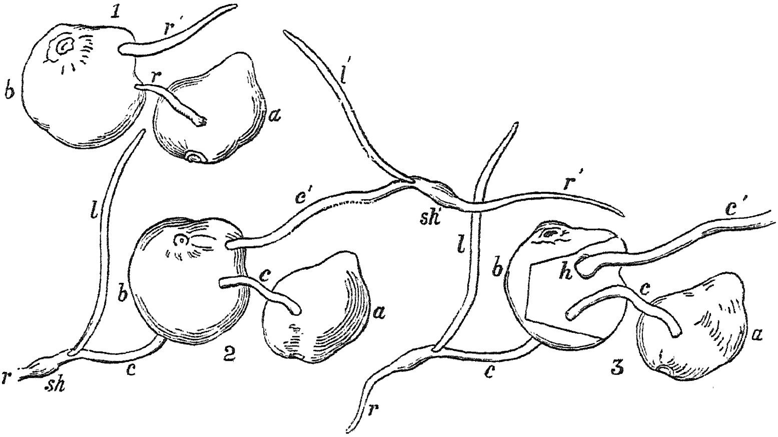


Fig. ii.—*Crinum longifolium* Thunb. (*Amaryllis longifolia* L.). Seeds germinating in a capsule which has been prevented from opening. 1. The radicle *r* of seed *a* has approached seed *b*. 2. The radicle and cotyledon of *a* have pierced *b*; the plumule, which has been carried through in the base of the cotyledonary sheath *sh*, is developing, the first leaf *l* having already emerged. The long cotyledon *c* still communicates with the seed from which it is absorbing nourishment. A precisely similar seedling is developing from *b*. 3. The same as 2, but the seed *b* has been cut open. Note at *h* the swollen sucker formed by the apex of the cotyledon.

From a drawing by R. A. Salisbury.

The germination of the seed as figured by Salisbury (fig. iii.) and Richard, and referred to by others, follows a course common to a number of monocotyledons. F. E. L. Fischer, for instance (in his *Beitrag. z. botan. System: die Existenz d. Monocotyledonen und d. Polycotyledonen betreffend*, published at Zürich in 1812), classes, from the point of view of their germination, *Crinum* and *Amaryllis* with fleshy seeds, with *Phœnix* and other Palms, &c., and says: "The peripheral end of the cotyledon with the contained embryo protrudes from the seed and elongates worm-like more or less, often for several inches. The radicle elongates in the same direction. . . . The place directly above the punctum saliens, where development is going on [*i.e.* the base of the cotyledonary sheath surrounding the plumule] swells and takes on a bulb form."

In 1840 a Dutch botanist, H. C. van Hall (*Tijdsch. Nat. Geschied.* vii. pp. 140–164), gave a full and well-illustrated account of the fruit, seed, and method of germination in *Crinum capense.* He takes the same view of the structure of the bulbiform seed as did Richard (see p. 146); his figures (fig. iv.) show well the elongation of the cotyledonary sheath carrying downwards the small radicle, the upper end of the cotyledon remaining in the seed to form a swollen sucker by means of which the nourishment in the endosperm is gradually absorbed. The plumule is surrounded by the base of the cotyledonary sheath, where the bulb very soon begins to develop, the sheath forming the outermost scale. His figures also illustrate the different length which the cotyledonary sheath attains under different circumstances. In one case where a seed was allowed to germinate at the edge of a board, and not supplied either with food or moisture, the radicle was carried vertically downwards by a cotyledonary growth six times the largest diameter of the seed in length, and still showed no trace of the leaf succeeding the cotyledon.

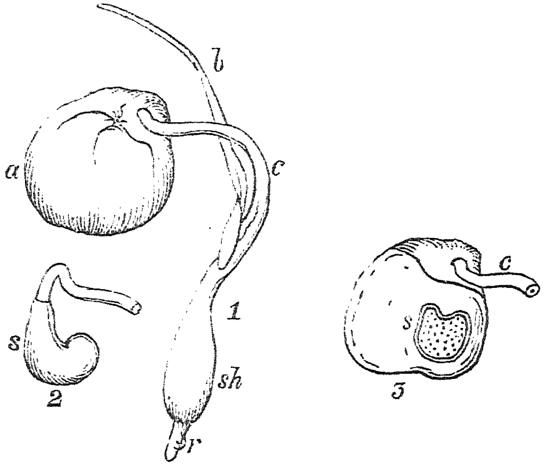


Fig. iii.—*Crinum longifolium* Thunb. (*Amaryllis longifolia* L.). 1. Seed germinating—*a*, seed; *r*, radicle; *c*, cotyledon; *b*, first leaf; *sh*, base of sheath of cotyledon which is already thickening to form the outermost bulb-scale, inside *sh* is the plumule. 2. Sucker, *s*, formed at the tip of the cotyledon by which the nourishment in the endosperm is absorbed for the use of the seedling. 3. Section of germinating seed showing the sucker, *s*, of the cotyledon lying in the endosperm.

From a drawing by R. A. Salisbury.

Later workers enable us to reconcile the differing statements as to the exact nature of the fleshy mass surrounding the embryo. In 1857 Henri Baillon (*Bull. Soc. Bot. Fr.* iv. p. 1020) showed that in

Hymenocallis speciosa the two integuments of the ovule after fertilization become much thickened, and fuse together with the nucellus to form the thick fleshy mass surrounding the embryo. Vascular tissue derived from the outer integument can be seen. In the next year Prillieux (*Ann. Sci. Nat.* ser. 4, ix. 97 (1858)) confirmed Baillon's statements on *Hymenocallis* (except that he states that the fleshy coat arises purely from the primine), but showed that in *Amaryllis Belladonna*, *Crinum erubescens*, *C. giganteum*, *C. taitense*, and *C.*

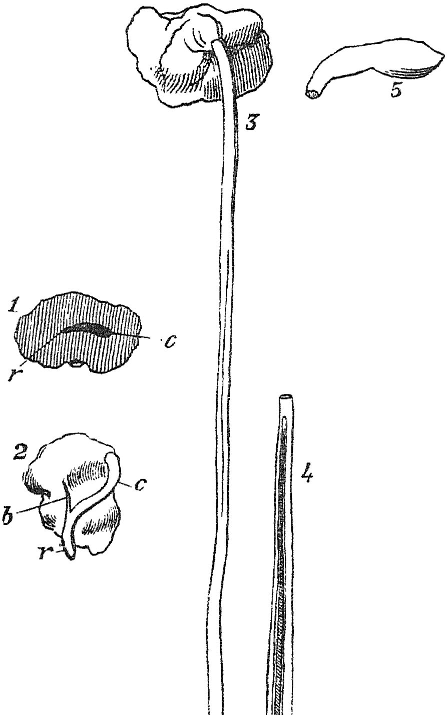


Fig. iv.— *Crinum capense* Herb. 1. Seed cut longitudinally, showing contained embryo—*r*, radicle; *c*, cotyledon. 2. Germinating seed—*r*, radicle; *c*, cotyledon; *b*, first leaf of plumule. 3. A dry seed germinating on the edge of a board: the cotyledon has grown to a great length, the first leaf of the plumule has not yet broken from the cotyledonary sheath. 4. Longitudinal section of the cotyledonary sheath showing also the long, narrow first leaves of the plumule. The sheath which ultimately forms the outermost bulb-scale is already thickening. 5. Sucker-like end of cotyledon which remains in the seed.

After H. C. van Hall, in *Tijdschr. v. Natuurl. Geschied.* vii. t. iii. Leiden, 1840.

expense the ovules are naked, and that the fleshy coat is derived from a *large development of endosperm*, on the outside of which the remains of the nucellus forms a thin membrane. Moreover, no vascular tissue occurs in the fleshy coat.

A. Braun (*Ann. Sci. Nat.* ser. 4, xiv. p. 9 (1860)) shortly afterwards confirmed Prillieux's observations on the occurrence of *two* kinds of fleshy seeds, which he named *bulbous*, where the outer of the two integuments of the ovule forms the fleshy seed-coat (as in *Hymenocallis*), and *tuberculous* (as in *Crinum*, &c.) respectively. He also drew attention to the fact, noted by Brown, that in some of the fleshy seeds (those in which their separation precedes the visible formation of the embryo) spiral vessels do occur in the fleshy mass, though Brown had previously stated in the *Prodromus* (p. 297) that the mass was purely cellular. The recognition of the existence of the two kinds of seeds helped to explain these differences. Braun also noted that several embryos might occur in one seed in *Hymenocallis*.

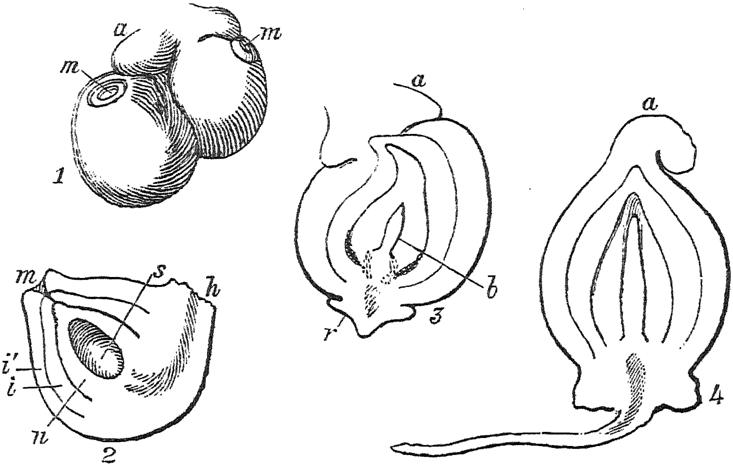


FIG. v. — *Calostemma Cunninghami* Ait. 1. Two anatropous ovules—*m*, micropyle; *a*, an aril-like outgrowth which ultimately forms a cap on top of the bulb. 2. Longitudinal section of one of the ovules shown in 1, showing the inner, *i*, and outer, *i′*, integuments surrounding the nucellus, *n*, in which is seen the embryo-sac, *s*; *m*, micropyle; *h*, hilum, or point of insertion of the ovule. 3. Longitudinal section of an ovule at a later stage—the base (chalaza) has become flattened, forming a disc, from the lower part of which a root, *r*, is growing, from the upper a bud, *b*, which is filling the cavity of the embryo-sac. 4. Mature bulbil in longitudinal section. The bud has completely filled the cavity of the nucellus, the remains of which, together with the integuments of the ovule, form the bulb-scales.

After Baillon, in *Compt.-Rend. de la 2me Session, Assoc. Franc.* 1874, t. iii.

A third kind of bulbiform seed was subsequently described by Baillon in an allied genus, *Calostemma*, in the Proceedings of the Association Française (Lyons, 1873). *Calostemma* was one of the Australian genera to which Brown referred in his original note in the *Prodromus*. In *C. Cunninghami* each of the three ovary-chambers contained two anatropous ovules, the development of which Baillon found to be at first quite normal; two integuments enveloped the nucellus, in the centre of which was apparently an embryo-sac. But instead of producing a seed, the ovule developed directly into a bulbil in the following manner (fig. v.). It became very much swollen at the base (*chalaza*), forming a disc-like structure, from the centre of which a root grew outwards and a conical bud inwards, occupying the central ovular cavity and growing up towards the micropyle. At the same time the integuments became fleshy, and formed, together with the remains of the nucellus, the outer scales of the bulbil.

Finally Goebel, in his *Pflanzenbiologische Schilderungen* (i. p. 129) (1889), has given a detailed account of the development of the seed in *Crinum asiaticum.* The ovules, of which there are two in each of the three ovary-chambers, recall in their extremely rudimentary structure those of parasitic plants. They are naked, consisting merely of an elongated swelling on the placenta, in the centre of which is an embryo-sac (sometimes two embryo-sacs occur in one ovule). After fertilization the embryo-sac becomes filled with endosperm, in which the small embryo is enclosed; occasionally a central narrow space remains in the endosperm, which Goebel suggests may be the central cavity referred to by Brown in those seeds in which he found no embryo, the latter from its small size having been overlooked. The endosperm continues to develop, growing out of the nucellus (of which only a small portion remains at the base), and forms a large fleshy mass, completely surrounding the small axial embryo. This growth in thickness takes place chiefly on the outside, where we find chlorophyll developed in the cell-layers. Ultimately a thin protective coating of cork is formed. Thus the ripe seed consists simply of a mass of endosperm enclosing an embryo. The endosperm forms a soft fleshy mass, in which are air-containing intercellular spaces, forming, as Goebel suggests, an adaptation for the distribution of the seeds by water, their specific gravity being thereby considerably reduced. The peripheral cork-layer prevents water-logging. A similar device occurs in some Water Lilies, where an additional seed-coat (the aril) forms a light air-containing float.

To sum up the results of previous work on the bulbiform seeds of *Amaryllideæ*, we find that three forms can be distinguished, as follows:—

A. *True seeds.* 1. Developed from a normal ovule, the outer integument of which becomes thick and fleshy after fertilization, and forms the substance of the bulbiform mass, *e. g. Hymenocallis.*

2. Developed from a naked ovule, the fleshy substance being derived entirely from the endosperm, which develops chlorophyll in its outer layers and continues to grow for some time, *e. g. Crinum asiaticum*, and other species.

B. *A vegetative growth replacing the seed.*

3. A normal ovule is produced, but a viviparous growth of an adventitious shoot and root takes place at its base, and a bulbil is formed, the ovule integuments forming the outer coats, *e. g. Calostemma Cunninghami.*

As regards germination, events seem to follow a course common to many bulb-forming monocotyledons (see, for instance, Lubbock's *Seedlings*, ii. p. 578). The radicle is pushed outwards and downwards by the growth of the cotyledon, in the sheathing base of which the plumule is protected; the tip of the cotyledon remains in the seed, acting as a sucker to absorb the nutritive endosperm. The formation of the bulb is soon indicated by the swelling of the base of the cotyledon-sheath, which forms the outermost bulb-scale. Under some circumstances the cotyledon may reach a considerable length before the plumule shows any sign of breaking through at its base.

SOME NORTH-EAST IRELAND RUBI.

By Rev. W. Moyle Rogers, F.L.S.

As bramble referee for the Watson Botanical Exchange Club, I have had dried specimens of Co. Down Rubi sent to me for annotation annually since 1893, the collectors being the Rev. C. H. Waddell and the Rev. Canon Lett, to both of whom I am very greatly indebted for help given me in the preparation of this paper. The majority of their specimens have caused me little or no difficulty, as they obviously belonged to familiar British forms; but in all of the packets in recent years there has been no inconsiderable admixture of unfamiliar-looking forms, which I only very gradually learnt to sort with any confidence. I was especially glad, therefore, of an opportunity of seeing the living bushes, over a fairly extensive area, under Canon Lett's guidance last July, while his guest for ten days at Aghaderg, near the western border of Co. Down. As we were favoured with exceptionally fine weather, we were able also to explore part of the contiguous north-east corner of Co. Armagh. These notes give the result. I have added brief remarks on some Co. Antrim Rubi, also seen growing in July last, partly by my son Rev. F. A. Rogers, and partly by myself; and also a few earlier records for the three counties by other collectors, whose specimens I saw. But I have thought it best not to include the numerous additional records for the three counties which were published from time to time in the *Irish Naturalist* and elsewhere, and are now embodied in Mr. Lloyd Praeger's recently issued *Irish Topographical Botany*.

For the counties visited I give the comital numbers suggested in *Irish Topographical Botany*—viz. 37, Armagh; 38, Down; and 39, Antrim. The living bushes were seen by me in every instance in which the locality is not immediately followed by the name of the collector. Glynn (near Larne), where I stayed for the few days I spent in Co. Antrim, is but poorly furnished with Rubi; but the Aghaderg, Banbridge, and Newry neighbourhoods (counties Down and Armagh) are exceedingly rich in distinct forms as in individual bushes. The bushes, however, grow almost exclusively in hedges, and so present special difficulties to the student—a circumstance which may to some extent account for the difficulty at first experienced in naming some of them. But I now believe that in the vast majority of cases Irish brambles are practically identical with those of Great Britain. As usual, an asterisk will be found prefixed in the case of new county records. Where the collector's name follows the locality given, the sign ! is added as often as I have seen specimens.

Rubus Idæus L. Appears to be generally distributed, though in some districts rather sparingly.

SUBERECTI.

R. suberectus Anders. 38. Castlewellan Lake, *Stewart*! The only Irish *suberectus* that I have seen, except a Westmeath plant from Knock Drin. I have seen no *R. fissus*.

R. Rogersii Linton. 38. Mile Hill Lane, Aghaderg; very local. Not yet found in any quantity in Ireland, but quite characteristic in this Aghaderg locality, as at Gilhall, Dromore (*Lett*!), and Saintfield (*Wardell*!), in other parts of Co. Down. I have also seen a Derry specimen, collected by Mr. Druce at Lough Neagh.

R. plicatus Wh. & N. Locally abundant. 37. Lane by Dublin Road, Newry. 38. Anacloan; Banbridge. *39. Ballymena; Cushendall; Giant's Causeway; but "not common," *F. A. Rogers*.

RHAMNIFOLII.

R. Lindleianus Lees. 37. Lurgan; Armagh, *Praeger*! Raughlin, *Waddell*! & *Lett*! Lough Gilly, *Druce*! Scarva, abundant; near Newry. 38. Aghaderg and neighbourhood; common. At Saintfield found only sparingly by Mr. Waddell. 39. Glen Dun, *Shoolbred*! Cushendall; Giant's Causeway ("not common"), *F. A. Rogers*; Glynn. In 37 and 38 usually very abundant and typical; but the form with roundish-cordate terminal leaflet referred to in my *Handbk. Brit. Rubi*, p. 28, as received from Canon Lett, is quite frequent in his neighbourhood, and in this one feature (the terminal leaflet of its stem-leaf), though not in other respects, it recalls the true *R. cordifolius* of *Rubi Germanici*.

R. rhamnifolius Wh. & N. 37. Armagh, *Praeger*! bushy ground near Newry. 38. Aughnadarragh, Saintfield, *Waddell*! near Gilford, *Lett*! Aghaderg. 39. Cairncastle, *Stewart*! The ordinary British form. Apparently quite frequent.

Subsp. *Bakeri* F. A. Lees. *38. Dry banks by the sea, Killough, *Waddell*!

R. pulcherrimus Neum. 37 & 38. Very abundant and characteristic. 39. Cushendall and Knocknacarry; Larne; Cave Hill, Belfast, *Shoolbred*! near Giant's Causeway, *Bailey*! & *F. A. Rogers*! Glynn.

VILLICAULES.

R. Selmeri Lindeb. 37. Tanderagee, *Lett*! Scarva and near Newry, very abundant. 38. Saintfield, *Waddell*! common at Aghaderg; Anacloan. 39. Cushendall; near Giant's Causeway, *Bailey*! & *F. A. Rogers*. Evidently as abundant and easily recognized through a great part of Ireland as in most parts of Great

Britain. Under this I now believe must come Canon Lett's Armagh (Tanderagee) and Antrim (Glendun) plants, for which I formerly suggested the name *R. gratus* Focke.

DISCOLORES.

R. argentatus P. J. Muell. *38. Aghaderg; local. Apparently rare in Ireland.

R. rusticanus Merc. 37. Tartaraghan; Armagh, *Praeger*! 38. Annaghdroghal; Comber and Castle Espin, *Waddell*! Ballintaggart, *Lett*! Aghaderg, seen in two spots only, viz. Mile Hill Lane and roadside towards Banbridge. 39. Common, and especially abundant near the sea.

[*R. pubescens* Weihe. 38. Saintfield, *Waddell*! Doubtfully thus named by me, and in need of confirmation.]

SILVATICI.

R. silvaticus Wh. & N. 37. Field south of Newry, near the reservoir, *hb. Lett*! Apparently this, but needing confirmation here and in 38 (Milltown and Clonallen, *Lett*. Saintfield, *Waddell*).

R. myricæ Focke, var. *hesperius* Rogers. *38. Lane north of Banbridge. Not seen in fruit, but clearly not distinct from Mr. Marshall's Mayo and Galway plant (Journ. Bot. 1896, 504), though nearly eglandular in panicle, and so one step nearer to typical *R. myricæ*.

R. macrophyllus Wh. & N. 38. Saintfield, *Waddell*! Aghaderg: wall near the Lough, quite in the open, for a good many yards; a conspicuous form with short roundish terminal leaflet and very floriferous large-flowered panicle.

Subsp. *Schlechtendalii* (Weihe). One of the most abundant and characteristic brambles of this part of Ireland. 37. Scarva; near Newry. 38. Saintfield, *Waddell*! Aghaderg; Anacloan; Banbridge.

VESTITI.

R. micans Gren. & Godr. *37. Scarva. 38. Fairly frequent. Banbridge, roadside near "Mutton Hill," a handsome highly glandular form; Aghaderg; Anacloan. Confirms previous uncertain record for Co. Down. *39. Near Ballymena, about two miles on the Larne Road; a very strong form, *F. A. Rogers*!

R. hirtifolius Muell. & Wirtg. 38. Under this aggregate species must certainly come a plant of Canon Lett's from Aghaderg, which I have seen in the dried state more than once: and also one from Saintfield collected by Mr. Waddell. They seem to go best with my var. *mollissimus;* as probably do the Westmeath (Knock Drin) plant, *Linton*!, Mr. Marshall's from Mullaranny, West Mayo, and Mr. Bailey's from Carnabridge to Portrush, Derry.

R. pyramidalis Kalt. 37. Lurgan, *Praeger*! Lane and bushy ground near the reservoir on the Dublin Road, Newry. 38. Saintfield, *Waddell*! Carrick, *Hanbury*! Aghaderg, *Lett*! abundant at Ballynanny, Anacloan. Reported by Mr. Waddell as "common at Saintfield and in most parts of the county." 39. Cave Hill, *Druce*! Cushendall ("very little"), *F. A. Rogers*!

R. leucostachys Schleich. 37. Lurgan, *Praeger*! Scarva; near Newry. 38. Aghaderg; Anacloan; Banbridge. Apparently common, though often uncharacteristic, in 37 and 38. 39. Cave Hill, Belfast, &c., *Shoolbred*!

EGREGII.

This group, it will be seen, is more highly represented than any other.

R. Lettii, sp. (or subsp.) nov. "*R. Gelertii* Frider., *Lettii* subsp. nov.," Wats. Bot. Exch. Club 1900–1901 Rep. p. 14. *Stem high-arching* at first, *stout*, bluntly angled, striate, *glaucous*, *clothed with long fine shining hairs; its acicles very unequally scattered and stalked glands very rare or absent. Prickles* mostly subequal and nearly confined to angles, *remarkably compressed and straight*, *long*, *slender*, nearly patent, hairy, occasionally gland-tipped. *Leaves* usually 5-nate-pedate, concave, pale *greyish-green*, very soft beneath with close shining hairs, often greyish-felted at first; *petioles long*, *with many unequal partly gland-tipped organs.* Leaflets somewhat imbricate at first; terminal slightly obovate, with fairly long cuspidate-acuminate point, subcordate base, and compound teeth; basal shortly stalked. *Panicle* long, *cylindrical*, lax below, and usually only slightly narrowed at the top; about one-third ultra-axillary; *the lowest branches moderately long and nearly erect. Rachis with very close grey felt under the long hairs*, armed like the stem, though usually much more glandular and aciculate, *with some of the long slender prickles gland-tipped; the prickles almost invariably straight and mostly patent or subpatent. Sepals* (like rachis and pedicels) remarkably grey-felted, *reflexed*, often long-pointed, usually quite unarmed and eglandular. Petals narrow, white or faintly pinkish. Stamens exceeding styles. Young carpels somewhat hairy. Fruit abundant and excellent.

While recalling *R. Gelertii* among the *Egregii*, and in earlier groups *R. Questierii* and *R. micans*, this seems most closely allied to *R. criniger* Linton, from which it may, however, without difficulty be distinguished by the long remarkably compressed slender prickles, the somewhat obovate terminal leaflet with more finely pointed teeth and less gradually acuminate point, and the cylindrical panicle with stronger gland-tipped organs, shorter more ascending lower branches, and broader top. The extraordinary greyness of the whole plant is also a very marked feature.

Under Canon Lett's guidance I saw it in great abundance in Aghaderg, Anacloan, and Banbridge parishes along the western boundary of Co. Down, and in Co. Armagh plentifully at Scarva, and more sparingly near Newry. Mr. Waddell has sent it to me from Saintfield, and he and Canon Lett are agreed in calling it "a very common Co. Down plant." I know nothing exactly like it in Great Britain, though the Rev. A. Ley has found a form which recalls it in Bolston Wood, Herefordshire.

[*R. Boræanus* Genev. 38. Aghaderg Glebe (locality now destroyed), *hb. Lett*! Probably this species, but, if so, untypical in the scarcity of the stem-pricklets and in the rather prickly panicle.]

R. cinerosus Rogers. *38. Caskum, Aghaderg; in one spot, rather abundant. This is the fourth Irish county in which this species has now been found.

R. mucronatus Blox. 37. Armagh, *Praeger* ! 38. Very local and variable. Saintfield, *Waddell* ! Aghaderg, *Lett* ! : Edenderry (typical); Mile Hill Lane (a nearly eglandular form); Knock Iveagh (apparently this), *hb. Lett* ! 39. Cave Hill, Belfast, *Druce* !

R. Gelertii Frider. *37. Near the Dublin Road, Newry. *39. Glynn, in considerable quantity; a handsome exceptionally glandular form.

R. anglosaxonicus Gelert. 37. Newry; Tartaraghan (form near subsp. *raduloides*), *Praeger* !

Subsp. *vestitiformis* Rogers. *38. Anacloan, in one lane, several bushes; a form with exceptionally long prickles. New for Ireland.

R. Borreri Bell Salt. 37. Near Newry, *Praeger* ! & *Lett* ! Lough Gilly, *Druce* ! Quite typical and in great quantity at Scarva and by the Dublin Road, Newry. *38. Aghaderg; Anacloan. Locally abundant.

R. Drejeri G. Jensen. *39. Glynn; hillside by limestone quarries. Typical, but seen only in small quantity.

Subsp. *hibernicus* Rogers. *37. Scarva, very abundant; near Newry, in no great quantity. 38. Common at Aghaderg and Anacloan, over a large area; near Banbridge; Saintfield, *Waddell* ! In wood-borders and hedges, with the next.

R. dunensis, sp. (or subsp.) nov. *Stem* bluntly angled, *considerably hairy*, with scattered unequal armature varying very greatly in amount, but *often quite Koehlerian in character*. Prickles mostly slender from stout base and rather short. *Larger acicles and bristles often gland-tipped.* Stalked glands many, very unequal. *Leaves very broad*, always *yellowish*, *conspicuously concave*, opaque and thinly strigose above, at first softly hairy beneath, *with somewhat sinuate sharply pointed compound teeth*. *Terminal leaflet* roundish-oval, *with long acuminate point* and cordate base; *intermediate exceptionally long and usually overlapping the subsessile basal ones*. *Panicle with short close pyramidal top* and *two or three distant lower racemose branches*, *remarkably brown in upper half*. Rachis slightly flexuose, with patent brownish hair hiding the crowded short-stalked glands; gland-tipped acicles exceeding hair rather few; prickles weak, declining or patent. Flowers cup-shaped. Sepals very glandular, brownish, soon rising and often remaining erect. Petals narrow, faintly pinkish or white. Stamens erect, exceeding styles. Carpels glabrous. Flowers early and fruits abundantly. Fruit excellent. One of the few earlier flowering and most abundant brambles in West Down and the adjoining parts of Armagh. Received also from Saintfield, East Down. Strongly recalls *R. Drejeri* and its two subspecies, but keeps quite distinct.

This is included under subsp. *hibernicus* in *Handbk. Brit. Rubi*, p. 63 (as a strong form); but, when constantly growing with it under like conditions, it flowers a fortnight earlier, and can always be distinguished from it at some distance by its yellow tint, concave leaves, and peculiar brownish panicle close-branched above and very lax below. The sinuation of the leaf-toothing is usually less marked than in *hibernicus*, but is still very unlike the shallow serration in *Drejeri* and the very even simple teeth in *Leyanus*. In *R. Drejeri* alone are the leaves chiefly 3–4-nate, and the terminal leaflet roundish, with short point.

I am convinced now that the right place for *R. dunensis* is not (as I for a time supposed) among the *Koehleriani* near *R. cognatus*, but among the *Egregii*, after aggregate *R. Drejeri*. The four forms may be thus contrasted:—

I. *Stem considerably hairy.*

(1) Leaves chiefly 3–4-nate. Leaflets roundish, with rather short cuspidate point, and shallow irregular teeth. Panicle narrow cylindrical.

R. Drejeri. Stem fuscous, dull. Leaves flat, green. Prickles often falcate, especially on panicle.

(2) Leaves usually conspicuously 5-nate. Leaflets with long acuminate point and compound sinuate toothing. Panicle pyramidal.

R. dunensis. Stem and leaves yellowish. Stem very prickly and aciculate. Leaves concave, thick, soft beneath, very broad, the long intermediate leaflets overlapping the basal. Panicle close above, with distant lower branches. Flowers early.

R. hibernicus. Stem and leaves green. Stem with thinly scattered prickles and acicles. Leaves soon quite flat, thin, comparatively narrow, rarely imbricate. Panicle long, lax throughout, with rigid upper branches. Flowers late.

II. *Stem subglabrous and shining.*

R. Leyanus. Stem yellowish-brown, with very variable armature. Leaves mostly 5-nate, green above, often grey-felted beneath, sharply evenly toothed. Panicle rather lax, much narrowed above, but with less formal outline than in *R. hibernicus.*

The existence of *R. Leyanus* in North-east Ireland now needs confirmation; but I am still disposed to refer to it Mr. Marshall's plants from Wexford and Mayo (see *Irish Top. Bot.* p. 105). Mr. Druce's records for 39 and 40 may also be right (as I thought at the time); but I no longer have his specimens to refer to.

RADULÆ.

R. radula Weihe. Typical, or nearly so. 38. Newcastle, *Druce*! Lisnagade, Aghaderg, *Lett*! 39. Near Giant's Causeway, *Bailey*! Cave Hill, *Druce*!

Subsp. *echinatoides* Rogers. 37. Tanderagee; Ballymore, *Lett*! Scarva, abundant; near Newry. 38. Aghaderg, in several places, but rather local. I am satisfied now that it was an exceptionally slender form of this subspecies that I named *R. rudis* Weihe for Canon Lett a few years ago (see *Irish Top. Bot.* p. 106). 39. Glenarm, *Lett*! & *Druce*! Cave Hill, *Druce*! & *Waddell*! Less glandular than usual.

R. echinatus Lindl. 37. Market Hill, *Druce*!

R. oigocladus Muell. & Lefv. var. *Newbouldii* Bab. *37. Scarva, in great quantity; near Newry. 38. Aghaderg; Anacloan; Banbridge. Locally abundant, but very variable: the Newry plant especially going a long way towards var. *Bloxamianus* (Colem.), though on the whole perhaps best kept under *Newbouldii*.

R. regillus A. Ley. 38. Gillhall demesne, *Lett*! A form less glandular than the Gloucestershire and Herefordshire type.

SUB-KOEHLERIANI.

R. Babingtonii Bell Salt. 37. Ferry Hill, *Lett*! Rather doubtful. *38. Drum Crow, *Waddell* in *hb. Lett*!

R. mutabilis Genev. *38. Lisnagade, Aghaderg, one clump; in shade, and so hardly typical, making some approach towards subsp. *nemorosus* Genev. An imperfect specimen from this thicket was wrongly named by me *R. adornatus* P. J. Muell. for the Watson Bot. Exch. Club (see Report 1900–1901, p. 17, second paragraph). New for Ireland.

R. Bloxamii Lees. *37. Lane near Newry, in some quantity; nearly typical, but with exceptionally stout prickles and lax panicle.

SUB-BELLARDIANI.

R. scaber Wh. & N. 37. Lurgan, *Praeger*! 38. Aghaderg Glebe; fairly abundant locally, with leaves exceptionally large in shade, and mostly 3-nate.

KOEHLERIANI.

R. rosaceus Wh. & N. var. *hystrix* (Wh. & N.). 39. Glen Dun, *Shoolbred*! Also form near subsp. *infecundus* Rogers, near Maralin (38), *Lett*!

R. Koehleri Wh. & N. 38. Newcastle, *Druce*! Aghaderg:—seen in two places only—(1) Mile Hill Lane; (2) Glebe field.

Subsp. *dasyphyllus* Rogers. 37 & 38. Common. Apparently the most abundant and generally distributed glandular bramble in North Ireland, as in North England.

BELLARDIANI.

R. saxicolus P. J. Muell. 38. Saintfield, *Waddell*! Apparently *R. horridicaulis* P. J. Muell., the strong form which Dr. Focke associates with *R. saxicolus*.

CÆSII.

R. corylifolius Sm. 37. Armagh, *Praeger*! 38. Castlewellan, *Stewart*! Aghaderg, *Lett*! 39. Cairncastle, *Stewart*! Cushendall, *Bailey*!—Var. *sublustris* (Lees). 38. Lindalgin, Saintfield, *Waddell*!—Var. *cyclophyllus* (Lindeb.). 37. Tartaraghan, *Praeger*! Ardmore, *Lett*! 39. Larne, *Shoolbred*! Widely distributed and variable. I saw no characteristic *sublustris* growing. As an aggregate, found by my son to be frequent from Larne to Giant's Causeway.

R. cæsius L. 37. Scarva. 39. Larne to Giant's Causeway; "fairly common," *F. A. Rogers*.

NEW BRITISH FUNGI.

By Dr. C. B. Plowright.

The descriptions subjoined of the three species new to our flora are from specimens in the Herbarium of the British Museum. The two Hymenomycetes have been figured by Mr. Worthington G. Smith on the sheets illustrative of the Basidiomycetes in the Botanical Gallery of the Museum.

Polyporus (*Fomes*) Euonymi Kalch. Icones Hung. t. 35, f. 3; Fries, Hymen. Europæi, p. 560; Sacc. Syll. vi. p. 182.

On the base of the stems of *Euonymus europæus*, near Salisbury; *Mr. E. J. Tatum*, 1899.

This is regarded by Fries as a subspecies of *P. Loniceræ*, but in the light of our present knowledge of the parasitic character of the Polypori it seems better to regard it as a distinct species. Although not previously observed in Great Britain, it is fairly common in France. It has been on the tables of the Paris Fungus Exhibitions on several occasions.

Monilia Glasti, n. sp. Pale lilac, in small patches which speedily become confluent. Conidia oval, pointed or rounded at either end, sometimes lemon-shaped, variable in size, 10–12 × 6–8 mm., sometimes 15 × 10. Hyphæ basal, few and inconspicuous, spore-clusters 120–200 mm. long. Conidia collapsing with a longitudinal fold when dry.

On woad-balls. 1900. Parson Drove Woad-mill, Cambridgeshire.

The fungus appears as a dusty coating on the outside of the balls into which the crushed leaves of woad (*Isatis tinctoria*) are made during the preparation of this substance in the fenland district of Cambridge and Lincolnshire, the only district in England where woad culture is still carried on.

Thelephora vitellina, n. sp. Pileus pale egg-yellow, flabelliform, expanded upwards, superior margin rimose, slightly incurved laterally. Hymenium rugulose, zoneless. Stem attenuated downwards, but enlarged at the base. Pileus ¼–½ or ¾ in. across (10–18 mm.), 1–1½ in. (20–30 mm.) high. Spores oval, 3 × 1–1·5 μ.

On a dead fir-branch amongst moss and in the interior of a fir-stem. Boat of Garten, 18 Sept. 1900; *Mr. Scott Elliot.*

This striking *Thelephora* was found during the excursions of the Scottish Cryptogamic and British Mycological Societies round Boat of Garten, N.B., Sept. 1900. Specimens were sent to M. Boudier, who pointed out its resemblance to *T. Sowerbeii* B. & Br., from which it differs in its pure yellow colour and lignicolous habit, as well as in the small size of its spores.

L'HÉRITIER'S SPECIES OF *RELHANIA*.

By Spencer le M. Moore, F.L.S.

The French botanist L'Héritier, as is well known, visited this country in 1786 and 1787, and recorded some of the results of his journey in his *Sertum Anglicum*, published at Paris in 1788. The fine collections made, chiefly in South Africa, by Francis Masson, a few years previously had been deposited in the Banksian herbarium, where, *inter alia*, L'Héritier studied the specimens of the genus *Relhania* forming part of Masson's treasure trove, publishing his conclusions in the *Sertum*, pp. 22–24. Owing to the brevity of the descriptions—brevity customary in those days—and also to the extraordinary neglect shown by authors of British colonial floras in consulting the National Herbarium, L'Héritier's species have, in some cases, been entirely misunderstood. I have recently worked over the Masson types, which are, I may add, authenticated in Solander's handwriting, and the following brief notes will, it is hoped, clear up all the doubtful points which have arisen. They will also, perhaps, serve to point a moral much to the purpose in these days of hasty monographing from the contents of single herbaria—a moral which emphasizes the necessity of a botanist having actual specimens before him if his work is to be of sterling value.

A. Relhania, L'Hérit.

1. R. squarrosa, and 2. R. genistifolia.—These species have been correctly understood by all authors.

3. R. microphylla.—This was placed by De Candolle (Prod. vi. p. 287) among the "species non satis notæ" at the end of the genus. The name is not cited by Harvey. To me it appears to be a narrow-leaved form of *R. genistifolia*; to be, in fact, *R. genistifolia* L'Hérit. var. *angustifolia* Harv. (Fl. Cap. iii. p. 300).

4. R. passerinoides.—This is made by Harvey a synonym of *Geigeria passerinoides* Harv., without the least shadow of a reason; and inasmuch as L'Héritier himself states that there is but a slight difference (in leaf) between his *R. passerinoides* and *R. viscosa*, one marvels as to what Harvey could have been about when perpetrating this absurd blunder. De Candolle (*l. c.* p. 285) comes nearer the mark, but he is still far astray, for, in spite of L'Héritier's just-mentioned note, while keeping *R. viscosa* in *Relhania*, he refers *R. passerinoides* to *Polychætia*, a genus merged by Bentham (Gen. Pl. ii. p. 326), and, following him, by O. Hoffmann (Engler and Prantl, Pflanzenfam. iv. 5. p. 197) in *Nestlera*. The type-specimen of *R. passerinoides*, it should be added, has a paleaceous receptacle, and so is not a *Nestlera*.

5. R. viscosa.—This name will have to disappear, for examination of the type shows it to be merely a fleshy-leaved form of *R. passerinoides*. It is placed by DC. (*l. c.* p. 287) among his insufficiently known species. Harvey passes it by without notice.

6. R. LAXA.—Another of De Candolle's "species non satis notæ." Again silence on Harvey's part. This is an erect slender-stemmed sparsely-branching herb, in all respects like *R. pedunculata* L'Hérit., except for its habit and the usually longer peduncles, which latter may attain a length of four or even six centimetres.

7. R. PEDUNCULATA.—As indicated above, this name will have to go. L'Héritier's type is similar to specimens called by De Candolle *Rhynchopsidium pedunculatum* (*l. c.* p. 290), both botanists having hit on the same trivial name, although the later author was quite unaware that he was describing an already known plant, for he places *Relhania pedunculata* L'Hérit. among his "species non satis notæ" at the end of *Relhania*. Harvey reduces *Rhynchopsidium* DC. to *Relhania*, *Rhynchopsidium pedunculatum* DC. becoming *Relhania pedunculata* Harv. As stated above, I believe this to be merely a small diffuse variety of *R. laxa* L'Hérit., which I propose to call var. *humilis*. The full synonymy will therefore stand thus: RELHANIA LAXA L'Hérit. Sert. Angl. p. 23, var. HUMILIS S. Moore. *R. pedunculata* L'Hérit., *l. c.* p. 23, De Candolle Prod. *l. c.* p. 287. *Rhynchopsidium pedunculatum* DC., *l. c.* p. 290. *Relhania pedunculata* Harv., *l. c.* p. 302.

8. R. LATERIFLORA.—This is the plant subsequently (1794) described by Thunberg (Prod. Plant. Cap. p. 146) as *R. sessiliflora*. Thunberg gives as a synonym of this *Athanasia sessiliflora* Linn., and he thus adopts the oldest trivial for the species. De Candolle (*l. c.* p. 290) makes *R. lateriflora* L'Hérit. a queried variety of his *Rhynchopsidium sessiliflorum* = *Relhania sessiliflora* Thbg.

9. R. CUNEATA.—Harvey (*l. c.* p. 300) gives Thunberg as the authority for this name, whereas a several years' priority is enjoyed by L'Héritier. As both authors cite *Athanasia uniflora* Linn. as a synonym, the *cuneata* of both authors would appear to be the same plant. It is the *Eclopes cuneata* of De Candolle (*l. c.* p. 288).

10. R. VIRGATA.—L'Héritier notes of this as follows: "admodum affinis præcedenti, cujus forte varietas"—yet De Candolle, although he places *R. cuneata* in *Eclopes*, can do nothing more satisfactory with the present plant than insert it at the end of *Relhania* among the insufficiently known species. Harvey is again silent here. After comparing the types of this species and the last, I am of opinion that *R. virgata* is only a narrower-leaved variety of *R. cuneata* with more rigid habit of growth. *R. virgata* L'Hérit. may therefore be called R. CUNEATA L'Hérit. var. VIRGATA S. Moore.

11. R. PALEACEA.—This was originally described by Linnæus as *Leyssera paleacea* (Syst. Veg. ed. xii. p. 560 [1767]), and in the same year by Berg as *Leyssera ericoides* (Descript. Plant. ex. Cap. Bon. Sp. p. 294). It was first referred to its proper genus by L'Héritier in the volume here under notice, and De Candolle (*l. c.* p. 286) describes the plant as *Relhania paleacea* L'Hérit. Cassini in 1827 (Dict. Sc. Nat. xlv. p. 30), on the plea that, all the Relhanias having paleæ on the receptacle, the prior trivial is objectionable, gave the plant the name of *Relhania ericoides*, and this is taken up by Harvey (*l. c.* p. 299), and he makes *R. paleacea* L'Hérit. a variety of *R. ericoides* Cass.

12. R. SANTOLINOIDES.—A species kept by De Candolle (*l. c.* p. 286). Harvey makes it a var of *R. ericoides* Cass., and, I think, correctly. L'Héritier himself writes of this—"an satis distincta a *R. paleacea ?*"

13. R. PUNGENS.—Kept up as such by Harvey. A synonym of *Eclopes subpungens* Less. in DC. Prod. vi. p. 289.

14. R. DECUSSATA.—This interesting plant seems to have been entirely unknown to modern authors, and, in consequence, has been the subject of several mistakes. De Candolle (*l. c.* p. 288) leads off by making *R. decussata* L'Hérit. a synonym of his *Eclopes decussata*, a species founded upon a plant of Ecklon's, and on Burchell 6763, which latter is *R. cuneata* var. *virgata*. Harvey considers Burchell's plant as typical *R. cuneata* "Thbg.," and so far he is not very wide of the mark; but he then takes an unhappy leap in the dark by hazarding the surmise that *R. decussata* L'Hérit. may be a synonym of *R. cuneata* "Thbg." The two plants, however, are entirely dissimilar, *R. decussata* L'Hérit. being more like *R. speciosa* Harv. In fact, its position in the genus is between *pungens* and *speciosa*, as will appear from the description here given:—

RELHANIA (§ *Eclopes*) DECUSSATA L'Hérit. Sert. Angl. p. 24. Suffrutex erectus, rigidus, sursum sparsim ramosus, ramis strictis foliosis juxta foliorum insertionem breviter araneoso-tomentosis ceteroquin glabris, foliis pluri- (circa 6-) fariatim dispositis arcte imbricatis sursum divergentibus subulato-linearibus triquetris apice pungentibus carnosulis, capitulis majusculis solitariis sessilibus campanulatis radiatis heterogamis, involucri phyllis circa 9-seriatis exterioribus necnon intermediis oblongo-ovatis obtusis marginibus scariosis erosulis intimis elongatis lanceolatis obtusis marginibus integris, receptaculi paleis lineari-lanceolatis longe acuminatis, ligulis involucrum paullo superantibus, styli ramis apice obtusis, achæniis lineari-oblongis radii hirsutis disci puberulis minoribus et verisimiliter sterilibus, pappi paleis angustissimis quam achænia multo brevioribus.

Caulis teres, 0·2 cm. diam., sursum foliosus deorsum vestigiis scutulæ formam habentibus instructus. Folia 0·5–0·6 cm. long., 0·05 cm. lat., pagina sup. late canaliculata ibique breviter araneoso-tomentosa ceteroquin glabra. Capitula circa 1·7 cm. long., vix totidem diam. Involucri phylla extima 0·4 cm. intermedia 0·6 cm. intima 1·0 cm long., hæc 0·14 cm. lat., omnia sursum nitentia et læte brunnea. Receptaculi paleæ 0·4 cm. long. Ligulæ lineari-oblongæ, circa 1·0 cm. long.; corollæ disci circa 0·5 cm. long. Achænia radii immatura 0·15 cm. long., 0·05 cm. diam.; disci circa 0.1 cm. long. et 0·02–0.03 cm. lat. Pappi paleæ subsetaceæ, radii achæniorum 0·12 cm. disci 0·04 cm. long.

Eclopes centauroides DC. (*l. c.* p. 288) seems closely allied to this, but its branches are described as hirsute in the young state, the heads are somewhat smaller, the inner involucral leaves "erose-lacerate," and the achenes glabrous. It will be noticed that L'Héritier's trivial name is misleading, as is his description of the leaves as decussate, which they certainly are not. This mistake has doubtless contributed to puzzle subsequent authors.

15. R. CALYCINA.—Both De Candolle and Harvey omit this, but they both mention *Relhania calycina* Poir. (Poiret (Lam. Encycl. vi. p. 95) cites the plant as *R. calycina* L'Hérit.), which they refer, and quite wrongly, to *Peyrousea calycina* DC. *R. calycina* Poir. finds no place in the *Index Kewensis*, whereas *R. calycina* L'Hérit. does, as a synonym of *Peyrousea calycina* DC. L'Hérit. gives *Osmites calycina* Linn. fil. Supp. 380 as a synonym of his *R. calycina*, and examination of the original types of the two show them to be identical. De Candolle and Harvey are thus quite wrong in their citation of *Osmites calycina* Linn. f. under *Peyrousea calycina* DC.

The *Osmites calycina* of Linnæus' herbarium is the plant subsequently described by Thunberg (Prod. Plant. Cap. p. 146) as *Relhania trinervis*, a name which therefore falls to the ground.

16. R. BELLIDIASTRUM.—L'Héritier gives as a synonym of this the *Osmites Bellidiastrum* of Linnæus (Sp. Pl. 1285). Of this latter De Candolle (*l. c.* p. 291) says:—"O. Bellidiastrum Linn. . . . videtur ex Less. Syn. 384 species Relhaniæ adhuc dubia, que Relhania Bellidiastrum Poir.," giving Poiret credit for the species instead of L'Héritier. Harvey leaves the name unnoticed. The founder of the species has an unfortunate note upon the plant which served as its type, as he writes:—"Pappus nullus: a genere sat aliena," which might well have puzzled anyone not enjoying access to the plant. But this is an error of observation; L'Héritier probably opened a young capitulum, and in this state I find it by no means an easy matter to make out the pappus with thorough satisfaction until after very careful examination, as it is pressed very closely against the tube of the young corolla, and some care is necessary in separating it.

This plant seems to me only a long-leaved variety of *R. paleacea* L'Hérit., although I have not met with any similar specimens either at the British Museum or at Kew. It may be characterized as follows:—

R. PALEACEA L'Hérit. var. BELLIDIASTRUM S. Moore. Folia elongata, mox patentia demum recurva, supra densissime albo-tomentosa, 1·5 cm. long.

It may be added that the specimen of *Osmites Bellidiastrum* in the Linnean herbarium is the same as L'Héritier's *R. Bellidiastrum*. Its localisation (Ethiopia) in Sp. Pl. is a palpable mistake.

SOME PLANTS OF SOUTH-WEST SCOTLAND.

By the Rev. E. S. Marshall, M.A., F.L.S.

During a fortnight's visit to Rothesay, in the second half of August, 1901, I made a few desultory botanical expeditions, which produced some discoveries of interest. My friend Mr. Alexander Somerville kindly drove me out to Quien Loch and Scalpsie Bay, at the south end of Bute; and I had a morning's walk along the shores of Loch Fad with Mr. Ballantyne, a botanist of the town.

Other collections were made during steamboat excursions; and a night was spent at Arrochar, in order to partially explore Ben Arthur ("The Cobbler") and Ben Ime. The vice-counties visited were—98 Argyle, 99 Dumbarton, and 100 Clyde Isles. "New records" are starred.

I am chiefly indebted for help in working out the gatherings to Messrs. Arthur Bennett, H. & J. Groves, E. F. Linton, Moyle Rogers, and Townsend.

Castalia speciosa Salisb. 100. The Quien Loch plant is var. *minor* DC. (under *Nymphæa*).

Fumaria Boræi Jord. 100. In fields at Lochranza, Arran.

Lepigonum salinum Kindb. 98. A curious form occurs at the head of Loch Long, near Arrochar, which is practically eglandular, but has the papillose seeds of *L. neglectum* Kindb.

Radiola linoides Roth. 100. Near Quien Loch; abundant on the western shore of Loch Fad; coast, Lochranza.

Rubus plicatus Wh. & N. 99. A tall-growing, bright pink-flowered form or variety was found on the railway embankment near Tarbet Station.—*R. Rogersii* Linton. 99.* Between Arrochar and Tarbet. 100.* Near the north-west end of Loch Fad.—*R. nitidus* Wh. & N. 99.* Near Tarbet station. — *R. Lindleianus* Lees. 100. Plentiful about Rothesay; *R. pulcherrimus* Neum. is still more so; and *R. Selmeri* Lindeb. not unfrequent. — *R. dumnoniensis* Bab. 100.* Outskirts of Rothesay; scarce. "I think certainly a form of *R. dumnoniensis*, with most of the very marked features of the type, though with less roundish leaflets and petals pale pink, instead of pure white," *Rogers in litt.*—*R. sertiflorus* P. J. Muell. 98,* 99.* Abundant about Arrochar and Tarbet; also gathered by Mr. Shoolbred and myself in 1896 at Ardlui. Dr. Focke then referred it to *R. fuscus* Wh. & N.; between which and *R. radula* Weihe it seems to be almost exactly intermediate. Mr. Rogers tells me that he has collected it at Callendar, Balloch, and Aberfoyle; and that Mr. C. E. Salmon has found a small form with ternate leaves in Cantire. Not previously recorded from Scotland; only known in England from Herts, Monmouth, and Hereford.—*R. corylifolius* Sm. 100. Near Rothesay; not typical.

Rosa pimpinellifolia × *tomentosa* (= *R. involuta* Sm. var.). 100. Lane near the south-west end of Quien Loch.

Callitriche autumnalis L. 100.* Quien Loch.

Epilobium hirsutum L. 100. Gathered by my wife on the shore between Ascog Point and Rothesay; not seen elsewhere.

Circæa alpina L. 99. On a wall at Arrochar.

Carum verticillatum Koch. In profusion on the hillsides above Loch Long (98), and above Tarbet Station (99).

Anthemis nobilis L. This is stated by Hooker, Stud. Fl. ed. 3, p. 212, to be "not indigenous in Scotland"; but it clearly is so near Quien Loch, where it occurs in a perfectly natural situation, accompanied by *Radiola*, &c.

Arctium intermedium Lange. 100.* Near the north end of Loch Fad; scarce.

Hieracium saxifragum Fr. var. *orimeles* F. J. Hanb. 98.*

Sparingly on Ben Ime, at 2500 ft.—*H. auratum* Fr. 99. Roadside bank near Arrochar; a "stylose" form.

Centunculus minimus L. 100. Near Quien Loch, in small quantity; and locally plentiful on the west side of Loch Fad.

Gentiana baltica Murb. 100.* Grassy shore near the landing-place, Lochranza; it was very scarce last year.

Euphrasia borealis Towns. 100.* Common near Rothesay.—*E. brevipila* Burnat & Gremli. 100.* Coast from Lochranza to Catacol Bay, in profusion; **E. scottica* Wettst. also occurred.—*E. gracilis* Fr. 98. Abundant up to 2000 ft. on the ascent to Ben Arthur; a decidedly hispid form, which I have seen on several of the West Surrey heaths, as well as about Aviemore, &c.—*E. stricta* Host. 100.* Locally plentiful on the stony western shore of Loch Fad, where it was much infested by an orange-coloured fungus. New to Scotland, I believe.

Mentha arvensis × *hirsuta* (*M. sativa* L.). 100. West side of Loch Fad, in company with the parents.

Stachys palustris × *sylvatica* (*S. ambigua* Sm.). 98. Coast, Inveraray. 99. Arrochar.

Atriplex Babingtonii Woods. 98. Abundant at Inveraray. 99. Shore of Loch Long, Arrochar; var. *virescens* Lange, I believe.—*A.* ? 100. In the loose sand of Scalpsie Bay we found abundance of a pretty plant with strongly muricate fruit, which I consider to be distinct from *A. Babingtonii*, and identical with immature specimens gathered in 1897 near Golspie, East Sutherland; these were referred by Herr Freyn (with some doubt) to *A. calotheca* Fr., a species which I do not know.

Salicornia herbacea L. 98. Head of Loch Long, in small quantity.

Sparganium affine Schnizl. 98. Pool in the ravine between Ben Arthur and Ben Ime, at about 2000 ft.; the same form which Pastor Neuman has named for me (from the Glen Spean mountains) as his var. *microcephalum*.

Scirpus cernuus Vahl, var. *pygmæus* (Kunth). Shore near Catacol Bay.

Carex binervis Sm. var. vel subsp. *Sadleri* Linton (*C. frigida* Syme, non All.). 98.* North-east side of Ben Arthur, sparingly, with the type; confirmed by Mr. Linton. Its only other known stations are Corrie Kander (South Aberdeen) and North Uist (*Shoolbred*!).—*C. Œderi* Retz. 100. North end of Loch Fad; strand near Catacol Bay.

Catabrosa aquatica Beauv. Of the variety, so plentiful at Scalpsie Bay, Mr. Bennett writes: "This seems to be var. *subtilis* Hooker, Engl. Fl. ed. 4, p. 36 (1838); var. *littoralis* Parn. Brit. Gr. t. 102 (1842); var. *minor* Bab. Man. ed. 1, p. 246 (1843)."

Glyceria declinata Bréb. (*G. plicata* var. *depauperata* Crépin). 100.* Coast, Lochranza. *G. plicata* Fr. occurs near Rothesay.

Festuca arundinacea Schreb. 99. Sparingly on the shore at Arrochar.

NOTICES OF BOOKS.

The Flora of the Presidency of Bombay. By THEODORE COOKE, C.I.E., etc., formerly Principal of the College of Science at Poona, and Director of the Botanical Survey of Western India. Part I. Pp. 192. London: Taylor & Francis. Price 8s.

The *Flora of British India*, edited, and for the most part also elaborated, by the veteran botanist, Sir Joseph Hooker, had for its scope, not only the vegetation of the whole of the Empire, from the Himalaya to Cape Comorin and Tenasserim, but also that of the provinces of Malacca and Wellesley, in the Malay Peninsula, and of the adjacent islands of Penang and Singapore. In that monumental work there had been brought together, not only the bulk of the information recorded in the books and scattered papers of the earlier writers on Indian botany, but also descriptions of many of the species named but undescribed in the great Wallichian Herbarium, and of the crowd of species, alike unnamed and undescribed, which had been brought together in the herbaria of numerous Indian travellers and collectors. Sir Joseph's work is a signal example of the centralization of botanical knowledge. It affords an admirable basis for the elaboration, in greater detail, of the individual floras of the various provinces included in the Indian Empire. The organization, some years ago, by the Supreme Government of India, of a botanical survey of the Empire, gave an official impetus to a scheme long projected and desired by Indian botanists for the preparation and publication of such floras. A beginning has now been made in the realization of this project by the publication, under the auspices of the Secretary of State for India, of a first part of a Flora of the Bombay Presidency. This is the work of Dr. Theodore Cooke, for many years Principal of the College of Science at Poona, and for some time Director of the Botanical Survey of Western India. Similar Floras of the North-Western Provinces of the Panjab, of the North-Western Himalaya, and of Bengal proper, are understood to be well advanced towards publication. A local Flora of the country round Simla (the summer capital of the Indian Empire), prepared by Major-General Sir Henry Collett, K.C.B., at his own cost and without Government assistance, is now being passed through the press, and it is to be hoped that the preparation of official Floras for the provinces of Assam, Madras, and Burmah may soon be arranged for. The Malayan provinces of Wellesley, Penang, Malacca, and Singapore were removed, shortly before the commencement of the preparation of Sir Joseph Hooker's Flora, from the administration of the Viceroy of India, and were formed into a colony under the designation of the Straits Settlements. The preparation of a special Flora of these provinces ceased, therefore, to be a responsibility of the Indian Government. The responsibility has, however, been accepted by the Straits Government; and precursors to a complete Flora, not only of the four provinces just mentioned, but of all the remaining provinces of the Malay Peninsula, have been for some years in course of publication in the *Journal of the Asiatic Society of Bengal*, under the title, "Materials for a Flora of the Malay Peninsula," and in the *Journal of the Straits Settlements*, in the form of complete accounts of various monocotyledonous families by Mr. H. N. Ridley.

Dr. Cooke's appearance as the pioneer of this enterprise must be hailed with satisfaction by everybody interested in the spread of botanical knowledge amongst our Indian fellow-subjects; but it is sincerely to be hoped that the scheme thus inaugurated may be carried through to the end at the high level of excellence at which it has now been begun. In this first part of Dr. Cooke's book the natural orders from *Ranunculaceæ* to *Rutaceæ* are dealt with, the sequence followed being that of Hooker's Flora. The part contains 192 pages, and gives descriptions of 335 indigenous species, and of a few introduced plants which have become naturalized. Of these species, no fewer than 130 are absent from Dalzell's census of the corresponding orders made in 1861—a signal proof of how much has been done in the way of exploration during the last forty years. Dr. Cooke's descriptions are in the form of those of Bentham in his Floras of Australia and Hong-Kong; and in crispness and graphic force they remind one of those in that excellent but too much forgotten work, Wight and Arnott's *Prodromus Floræ Peninsulæ Indicæ*. Excellent generic and specific keys are supplied, and the date of the original publication of each specific name is given immediately after the name of its author.

In a Flora which is primarily intended for use by persons who are not botanical experts, full citations of synonyms (some of which are often doubtful) are a waste of time and space, and Dr. Cooke has exercised a commendable discretion in keeping his references within comparatively narrow limits. Sir Joseph Hooker's Flora is quoted as a matter of course, and so are the catalogues of Graham, Gibson, Talbot, and Woodrow, and also the Flora of Dalzell and Gibson; but old books, such as Rheede's *Hortus Malabaricus*, are not quoted. Vernacular names are given when such are current. Brief notes of economic uses are supplied, and Dr. Watts's *Dictionary of Economic Products* is invariably quoted. In the case of the less widely distributed species, localities are nearly always given. The book is really a model of good systematic work. It is well printed, and its pages are disfigured by very few typographical errors. When it shall have been completed, a great impetus and encouragement may, it is hoped, be given to the cultivation of botanical knowledge by all those whose duties or inclinations lead them into the fields or forests of the senior Presidency of India.

G. K.

La Botanica in Italia. Materiali per la Storia di questa scienza raccolti da P. A. Saccardo. Parte seconda. Venezia: C. Ferrari, 1901. 4to, pp. xv, 172.

Six years ago (Journ. Bot. 1896, 188) we noticed the first instalment of the work of which a second part now comes to hand. We gave then some account of the plan and general scope of the work, and expressed a high opinion of its value. That opinion is strengthened and confirmed by this second portion, in which Prof. Saccardo gives us a number of additions to the biographies epitomized in part i., and adds a large number of names which were omitted from the former issue. Unlike the *Biographical List of British Botanists*, which it is pleasant to think suggested to the author the idea of the work, this Italian biography includes the living as well as the dead—a plan which enables information to be gathered at first hand from those most concerned in the notices, to the great advantage of future biographers.

Besides the alphabetical list which forms the principal part of the book, Prof. Saccardo gives us a chronological list of the principal events in the history of Italian botany, one of collectors in Italy, notices of the principal gardens, public and private, and some letters from Venetian naturalists, the whole concluding with an excellent index to the two parts, which we regret are not paged continuously so as to form one volume.

A few English names occur in the book. The author may be excused for not having identified the "R. C. Alexander, inglese, nella prima metà del sec. xix; erborizzò in Sicilia e comunicò le piante al Gussone" with the veteran botanist who added "Prior" to his earlier name, and has been known to later generations by that patronymic. Another Englishman, the eminent agriculturist Arthur Young, whose claims to inclusion are somewhat slight, affords one of the singularly few slips in spelling which are to be found in the book, wherein his name appears as "Yung."

It is much to be desired that some one in every country should undertake a compilation of this kind. If this were done, it would be possible to compile from the whole a volume which would, to a very large extent, form a handy and useful compendium not only of botanical biography but of botanical research, and would be of incalculable value to the historian and the student.

The Story of Wild Flowers. By Rev. Professor G. Henslow, M.A., F.L.S., F.G.S., &c. With 56 illustrations in text; pp. vi, 249. G. Newnes & Co. Price 1s.

It is impossible not to sympathize heartily with the object of this little work, which is, in the author's own words, to put some life into the dry bones of mere structure, by inducing students to observe the life history of plants and the various devices whereby they make their living, instead of resting content with dissections and classifications. We cannot think, however, that the execution is as good as the intention, or that the average reader will be greatly enlightened or assisted by the very considerable mass of particulars provided for his consideration. These are for the most part taken from the various works of Mr. Darwin, although in his preface our author begins by asserting categorically that "Darwin has been proved to be wrong," and that the theory of Natural Selection must be abandoned for that of "Adaptation to new conditions of life." In favour of this latter it is not easy to discover evidence in the pages before us. Details are in fact presented in such a manner as to suggest, at least to ourselves, no particular conclusion at all, while the language is not unfrequently so careless as to make it somewhat difficult to know what is meant; as in the following:—

"Now the way this [change of aleurones into peptones] is done is exactly like the process in our own bodies, for these substances stored up are the white 'endosperm,' as botanists call it, but everybody else 'flour,' when ground, have to form our own flesh and bones and nerves, etc." (p. 46).

So again of the modification of organs we are told (p. 98):—

"All the above mentioned instances and many more might be given would have been called sports, 'imitative sports,' perhaps, had they occurred suddenly. But since they are now constant features in the plants possessing them, they cannot be classified as such, though possibly originating in the same way."

J. G.

BOOK-NOTES, NEWS, &c.

The sudden death of Thomas Rogers, of Manchester, on 30th May last, has removed one of the very few remaining links between the old race of Lancashire botanists and those who now follow in their footsteps. His loss is deeply felt in many a local institution and society, for he had been during a very long period a vigorous, though unassuming and modest, supporter of nearly all those associations which have for their aim the promulgation of botanical and biological study. Born in 1827 at St. Helens, from early life he had lived in the heart of the city of Manchester, and may be said to have been the architect of his own fortunes. In 1857 he wrote a short paragraph in the *National Magazine* describing a small fern-conservatory he had both designed and affixed outside his windows. This good work and example, soon successfully followed by several who could afford the small cost, in the smoky neighbourhood of Ancoats, brought him into prominence, and was the means of his introduction to many scientific botanists and horticulturists, and it may be said that from this date he began critical research into the Cryptogamia, more especially studying the Filices, Musci, and Hepaticæ. He personally collected in all the most favoured localities in this county and Ireland: in 1875, for instance, and again a year or two later, in company with Messrs. J. Whitehead, S. Ashton, and others, he visited the Breadalbane and Cairngorm Mountains, and published an account, read before the Oldham Scientific Society, of the results of these expeditions, which were altogether extremely successful. He was a correspondent of Dr. Braithwaite, the late Mr. Henry Boswell, of Oxford, the late Dr. Carrington, Mr. Abraham Stansfield, Mr. John Nowell, of Todmorden, among others; and exchanged considerably with several Australian and Tasmanian collectors, notably Mr. R. A. Bastow, his herbarium becoming especially perfect in Musci from that continent. Nor did he altogether neglect the Phanerogamia, either British or exotic. One of his early friends was the late Mr. Richard

Buxton, author of the *Manchester Botanical Guide*; indeed, he was the possessor of the original manuscript of this work, which may be said to have a considerable local value. He was also largely and favourably known as a conchologist, having discovered two species of land molluscs as natives of Great Britain; and, later in life, evinced considerable interest in Egyptology. But what he will be best remembered by, in the years to come, in Manchester, was his long connection with the Society known as the "Ancoats Brotherhood," and likewise the Art Museum, situate at Ancoats Hall. He strove by all means in his power to interest and imbue the many toilers in the heart of a bustling city with the delights of nature, and achieved great and deserved success. It was, indeed, at the Whitsuntide outing of the Brotherhood this present year that he, their chosen leader, escorted a party of over seventy in number to Patterdale, with a view to the ascent of Helvellyn. On Whit-Thursday he started with them, in the best of health and spirits to all appearance, but when a little more than half-way up, at a height of about 1800 ft., illness suddenly supervened from failure of the heart's action, and he expired almost immediately. The funeral took place at Patterdale Church on the following Saturday, June 1st, and was attended by very many of those to whom he had endeared himself by the bright example of a blameless and unselfish life.—J. C. M.

We have received a reprint of a paper entitled "Ueber den Einfluss des Kerns auf das Wachsthum der Zelle," by J. J. Gerassimow; an extract from the Bulletin de la Société Impériale des Naturalistes de Moscou (Nos. 1 & 2, 1901). The author, who is well known for his researches on artificially produced abnormal cells of the *Conjugatæ*, gives a full account of his observations in this group on both non-nucleated cells and cells with an excess of nuclear substance. A comparison of the growth of such cells with that of normal cells sheds an interesting light on the important question of the inter-relation of nucleus and protoplasm. The work is provided with two plates and with forty-seven tables, exhibiting clearly the increase in size of the various cells.

The Rev. John Vaughan publishes in *Longman's Magazine* for September an interesting paper on "Essex and the Early Botanists"—a subject which Mr. Boulger is treating more scientifically in the *Essex Naturalist*.

Mr. E. D. Marquand's *Flora of Guernsey and the Lesser Channel Islands* has just been published; we hope to notice it later.

We have received the Report of the Botanical Exchange Club for 1900 and that of the Watson Exchange Club for 1900–1901, from each of which we hope later to give some extracts.

Mr. G. C. Druce has reprinted in pamphlet form from the *Chemist and Druggist* his "North African Experiences" in the spring of 1900. Many botanical notes are scattered through the pages, to which is prefixed a portrait of the author in his official robes as Mayor of Oxford.

NEW PLANTS FROM THE CAPE PENINSULA.

By Major A. H. Wolley Dod.

In critically examining a number of doubtful plants among those I brought home with me from the Cape Peninsula, Mr. N. E. Brown has discovered the following new species. I take this opportunity of most cordially acknowledging the inestimable help he has afforded me, not only in determining a large quantity of doubtful species, but in my own determinations during the past three years.

I am indebted to Dr. Masters and to Mr. N. E. Brown for the descriptions of the species to which their names are appended.

Heliophila tabularis, sp. n. Annual, glabrous, 3–5 inches high; leaves narrowly linear, about 1 inch long, trifid, with the lateral segments arising from the middle of their length, or entire. Petals oblong, yellowish; pedicels rather stout, about ¼ inch long. Pods erect, 14 lines long by ¾–1 line wide; style ensiform, 1 line long.

Orange Kloof, at about 2500 feet. Oct., *Wolley Dod*, 3338.

Near small forms of *H. trifurca*, but differing in the colour of the flowers, its erect pods on relatively shorter pedicels, and in the shape of the style, which in *H. trifurca* is cylindrical or subclavate.

Muraltia brachypetala, sp. n. Shrubby, 6–12 inches, branches pubescent; leaves fascicled, linear, keeled, erect-patent; flowers sessile; sepals lanceolate, acute; upper petals ¾ line long, slightly exceeding sepals; capsule with four long slender horns.

Hills west of Simon's Town. Aug.–Oct., *Wolley Dod*, 1426, 1871.

Superficially much resembling *M. Heisteria*, but a much lower growing shrub, with narrower more erect leaves tapering more gradually into a mucro, and differing essentially in its very short upper petals.

M. demissa, sp. n. Shrubby, 6–12 inches, irregularly much branched; leaves slightly fascicled or single, 2½–4 lines long, closely set, erect-spreading or somewhat recurved, concave on face, keeled below, pungent; flowers sessile, sepals 1½–1¾ lines, broadly ovate-lanceolate, subacute, or obtuse with a short apiculus; upper petals ⅔–¾ line, straight, linear, acute. Capsule not seen.

Frequent on the Cape Peninsula. Aug.–Dec., *Wolley Dod*, 1146, 1450, 2761.

This species appears to have been confounded with the dwarf scrubby forms of *M. filiformis*, from which it differs in being much more irregularly branched, its shorter and more spreading leaves, shorter, broader, less acute sepals, and especially in its longer acute upper petals.

M. recurva, sp. n. Shrubby, 6–10 inches, not branched, or only so in the uppermost part; leaves fascicled, 2½–4 lines long, rather laxly set, somewhat strongly recurved, almost flat on face, scarcely keeled, pungent; flowers sessile, sepals 1½–1¾ lines long, broadly lanceolate, acute; upper petals ½–⅔ line, narrow-linear, subacute. Capsule not seen.

Orange Kloof. July, *Wolley Dod*, 2726.

Near *M. demissa*, but differing in habit and leaves, sepals somewhat narrower and more acute, and upper petals shorter and less acute. A plant from near Simon's Town, *Wolley Dod*, 1555, is intermediate in foliage, but has very acuminate broad sepals. It may be distinct.

Hermannia rudis N. E. Brown, sp. n. Suffruticose, branched, 6–12 inches high. Branches erect or ascending, woody, tuberculate, tubercles stellately hairy on the apex. Leaves subfasciculate, ¼–½ inch long, 2–4 lines wide, coriaceous, cuneate, folded, very obtuse or subtruncate at the apex, 3–5-toothed. Stipules 1–3 lines long, ⅓–1½ line wide, lanceolate, acute, glabrous on both sides, or stellato-scabrid on the back, stellato-ciliate. Flowers crowded or subcapitate at the apices of the branches. Peduncles very short, ½–¾ line long, 2-flowered. Bracts and bracteoles 2–3 lines long, ½–1½ line wide, lanceolate, acute, stellato-scabrid on the back; bracts sometimes connate, deeply bifid. Pedicels ½–1 line long, stellato-pubescent. Calyx 4 lines long, 5-lobed to the middle, subinflated, pentagonal-campanulate, stellato-pubescent; lobes 2 lines long, 1¾–2 lines wide, ovate, acute, erect, incurved at the apex. Petals scarcely exserted from the calyx, convolute, 4 lines long, 1¾–2 lines broad at the apex, claw concave, strongly inflexed at the edges, densely pubescent from the top to the sides. Lamina broadly obovate, subtruncate, or shortly emarginate, glabrous. Stamens included; filaments 1¾–2 lines long, ½ line wide, oblong, acute, connate at the base into a very short tube, glabrous. Anthers ¾ line long, linear-oblong, obtuse. Ovary shortly stipitate, pentagonal, tomentose above. Style 1¼ line long.

Cape Peninsula, July–Sept., *Bolus*, 4950; Chapman's Bay, *Wolley Dod*, 1446; ridge by Smitswinkel Vley, *Wolley Dod*, 2704.

This is a very frequent species on the southern portion of the Cape Peninsula, and, though it has been known for many years, it has not been described. It most resembles *H. flammea* Jacq., for which it has been mistaken, but it differs in its subcapitate inflorescence, and its corolla being scarcely longer than the corolla.

Var. *exserta* N. E. Brown. Branches more slender. Leaves narrower, 1–2½ lines broad. Calyx subglobose, 3 lines long and broad. Corolla shortly exserted.

Slopes above Miller's Point, *Wolley Dod*, 2997.

Agathosma stricta, sp. n. Very erect, about 12 inches high, with erect pubescent branches; leaves erect, linear, 3–5 lines long, somewhat incurved at the subobtuse apex, channelled above, bluntly keeled beneath, longly ciliate, and minutely denticulate; flowers umbellate, on glabrous peduncles 1½–2 lines long; calyx lobes linear, about 1 line long, obtuse, glabrous on back, ciliate at the edges; petals white, about 2 lines long, the claw shorter than or about equalling the calyx lobes, slightly ciliate below, very gradually expanded into the lamina; sterile filaments equalling the petals, but on longer claws, which are densely ciliate throughout, and suddenly expanded into a lamina. Style glabrous.

Constantiaberg. Nov., *Wolley Dod*, 1935.

Very near *A. rubra*, but differing in its ciliate leaves, much longer glabrous peduncles, and shorter glabrous calyx.

Phylica Dodii N. E. Brown, sp. n. Shrubby, branched. Branches terete, glabrous, densely leafy. Leaves alternate, spreading or ascending, more or less incurved, 3–8 lines long by ⅔–1 line wide, very shortly petiolate, linear, exstipulate, pungent-mucronate, the margins strongly revolute, the upper ones pubescent, the lower glabrous. Heads 1 inch in diameter, involucrate. Outer bracts 6–7 lines long by 1–1½ line broad, lanceolate, acute, softly pilose-pubescent, at length reflexed, the inner smaller. Flowers sessile, bibracteolate. Bracteoles opposite, 1⅔–2½ lines long by ⅛–¼ line wide; linear or filiform, longly adpressed-pilose. Calyx externally adpressed-pilose, internally glabrous, 5-lobed; tube 1⅔ line long, lobes 1⅔ line long, ⅓ line wide, attenuate, acute. Petals minute, ⅖ line long, ⅛ line wide, lanceolate, acuminate, glabrous. Filaments abruptly reflexed at the middle. Style ½ line long.

Paulsberg slopes near the sea. Sept., *Wolley Dod*, 2872.

Somewhat resembling *P. capitata* L., but differing in its much smaller heads, with much shorter and broader bracts.

Crassula tenuis, sp. n. Annual, much branched, slender, diffuse, glabrous. Leaves opposite, subsessile or sessile, 1½–1¾ line long by ½–¾ line wide, elliptical or oblanceolate, very obtuse. Peduncles axillary, extremely slender, ½–1 inch long. Flowers about ¾ line long. Petals pale pink, obtuse, connected below. Calyx lobes about equalling corolla, obtuse, glabrous.

Rocky shore near Kamp's Bay, *Wolley Dod*, 3369, Oct. Signal Hill, *Wilms*, 3252.

Distinguished amongst its allies in § *Glomeratæ* by its very diffuse slender habit, elliptical leaves, and very long very slender peduncles.

Stoebe rosea, sp. n. Shrubby, much branched, the branches glabrous, erect; leaves 2–3 lines long by ½ line wide, linear, densely set, spirally twisted, with a callous subpungent point, silky or somewhat floccose when young, but soon becoming glabrous. Flowers in dense subspherical heads, 5–6 lines in diameter; involucral scales 1¾–2 lines long, yellowish brown, very acute; corolla bright deep rose; pappus densely plumose, snow-white, conspicuously exceeding corolla. Young achenes glabrous.

Locally frequent from Muizenberg southwards. Jan.–March, *Wolley Dod*, 273, 2417.

Apparently confounded with *S. æthiopica*, but quite unaccountably so, that being a much stouter larger plant, with spreading or prostrate branches, much larger flower-heads, with white corolla, at least in Peninsula examples, though Harvey describes them as bright purple. Its pappus is not conspicuous as in *S. rosea*.

Matricaria sabulosa, sp. n. Annual ?, prostrate, stout, corymbosely branched above, glabrous, but covered all over with sessile viscid glands. Leaves fleshy, ¾–1½ inch long, pinnate, the median portion about 1 line wide, with about four pairs of oblong pinnæ, which are obtuse, 3–4 lines long by 1–1½ line wide, irregularly and very obtusely toothed. Peduncles stout, 1–1½ inch long, usually with a bract about the middle, forming a rather lax corymb. Involucral scales keeled, obtuse, membranous-edged. Anthodes rayless. Corolla 5-lobed, tube considerably inflated. Achenes angular, with a very short toothed pappus.

Shore between Sea Point and Kamp's Bay. Nov., *Wolley Dod*, 3421.

Quite unlike any other South African species, but perhaps altered from its normal characters by its maritime situation.

Wahlenbergia depressa, sp. n. Annual, tufted, 2–4 inches high, much branched, branches hispid. Leaves crowded, opposite, elliptical, 6–7 lines long by 1½ line wide, denticulate, hispid. Flowers terminal, sessile. Calyx 2½–3 lines long, tube obconical, hispid, strongly ribbed, lobes about 1 line long, subglabrous externally, hispid within, broad and rounded at the base, acuminate and pungent at the apex, the margins incrassate, subrevolute. Corolla about 1 line long, cylindrical, hispid within, lobes about ¼ line long. Capsule 3-celled.

Northern slopes of Lion's Head. Nov., *Wolley Dod*, 3516.

Somewhat resembling *W. montana* DC., but considerably more hispid, leaves much more strongly denticulate, very different calyx lobes, and much smaller corolla. It also bears a strong superficial resemblance to dwarf tufted states of *Microcodon hispidulum* Sond., but, besides the generic characters, its far shorter calyx lobes readily distinguish it.

Roella amplexicaule, sp. n. Erect, not much branched, about a foot high, glabrous, densely leafy. Leaves about 3 lines long, amplexicaul or subdecurrent, broadly ovate, rigid and coriaceous, strongly and sharply serrate, the teeth often hooked, apex pungent. Floral leaves larger, suborbicular, thinner, more finely serrate. Flowers capitate. Calyx slightly exceeding floral leaves, about 6 lines long, tube rather longer than the lobes and narrowed upwards, lobes lanceolate acute, densely ciliate. Corolla campanulate, about 9 lines long, very pale blue, lobes 2½–3 lines long.

By the stream in Steenberg Valley, Jan., *Wolley Dod*, 808. Simon's Bay, Dec., *MacGillivray*, 959. Hills above Simon's Town, Dec., *Milne*, 154.

Quite distinct from any other species.

Sebæa ochroleuca, sp. n. Annual, 2–3 inches high. Leaves semi-amplexicaul, broadly ovate, obtuse, 3–5 lines long. Inflorescence cymose, rather dense, cymes ½–1½ inch diameter. Calyx 4-fid, broadly ovoid, about 1½ line long by 1 line broad, segment membranous, with a broad herbaceous wing on the back, the apices aciculate, squarrose. Flowers very pale yellow or white, darkening in drying. Corolla 4-lobed, projecting when closed about 1 line beyond the calyx, lobes oval subacute. Stamens inserted in the sinuses of the corolla lobes, filaments very short, anthers with one apical gland. Style with a ring of hairs a little below the top, stigma capitate.

This is a frequent plant on the Cape Peninsula in Sept.–Oct. *Wolley Dod*, 3058, 3146, 3252, 3270, 3436. It appears to have been overlooked by earlier collectors. It differs from its allies in the very broad wing to the calyx lobes, and in the colour of its flowers.

S. gibbosa, sp. n. Annual, 6–8 inches high, branched from the base. Leaves broadly ovate, obtuse, 3–6 lines long by 3–4 broad. Inflorescence dense, cymes about 2 inches in diameter. Calyx 4-fid, segments 1 line long, concave, keeled, not winged, gibbous near the subtruncate, obtuse, or apiculate apex, the apiculus erect. Flowers bright yellow. Corolla 4-lobed, when folded projecting 1½–2 lines beyond the calyx, the segments oval subobtuse. Stamens inserted in the sinuses of the corolla lobes, the filaments about equalling the anthers, which have an apical gland. Style without a ring, stigma cylindrical or subclavate.

By railway near Muizenberg Vley. Jan., *Wolley Dod*, 2332.

Much resembling *S. aurea* R. Br., but differing in the concave calyx lobes, with obtuse or apiculate connivent apices, those of *S. aurea* being aciculate, and very spreading or even hooked. The style characters also differ.

S. rara, sp. n. Annual, 1½–2 inches high, unbranched. Leaves opposite, strap-shaped, erect, subacute, 3–4 lines long by ½ line wide. Inflorescence cymose, its branches suberect. Calyx 5-fid, lanceolate in outline, 3 lines long by 1½ line wide, lobes strongly keeled, very acute. Flowers bright yellow. Corolla 5-lobed, when folded projecting 1 line beyond the calyx, the segments narrow, obtuse. Anthers sagittate, sessile, inserted a little below the sinuses of the corolla lobes, without glands. Stigma cylindrical, exceeding the anthers.

Near Uitvlugt. Nov., *Wolley Dod*, 3413.

Not unlike *Lagenias pusilla* E. Mey., but I prefer to keep it in *Sebæa*. It differs at sight by its somewhat larger size, and strongly keeled calyx lobes. Moreover, its sessile anthers and cylindrical stigma quite remove it from *L. pusilla*. It is unlike any known *Sebæa*.

Suæda cæspitosa, sp. n. Herbaceous, cæspitose. Barren shoots very leafy, leaves about ½ inch long, linear acute, flat on face, slightly rounded on back. Flowering shoots considerably exceeding the barren ones. Inflorescence spicate, monœcious, the upper portion male. Flowers about three in a cluster, sessile. Bracts 3–4 lines long, 1–1¼ line broad at base, tapering to a subacute apex.

Paarden Island. Oct., *Wolley Dod*, 3396.

Unlike any other South African species of *Suæda*, and much resembling *Chenolea diffusa* Thunb. in habit, though of a totally different colour.

Gnidia parvula, sp. n. Dwarf, branched from the base, branches virgate, glabrous, leafy. Leaves subsessile or very shortly petiolate, erect, narrow-lanceolate, 3–5 lines long by ½–1 line wide, acute, glabrous, the floral ones not differing. Flowers capitate, 6–8 in a cluster. Calyx somewhat thinly adpressed-hairy, tube 3 lines, limb ¾ line long, segments oval obtuse with incurved edges. Stamens 8. Squamæ 8, glabrous, as long as the calyx segments.

By the Signal Station. Aug., *Wolley Dod*, 2928.

Unlike any other South African species, but superficially much resembling *Arthrosolen laxus* E. Mey., for which it has not improbably been passed over.

Hypodiscus capitatus Masters, sp. n. Stems cæspitose, about 18 inches high, as thick as a crow-quill, erect, simple, subcompressed, spotted; leaf-sheaths fine, 1¼–1½ inch long, tightly convolute, coriaceous, shortly mucronate, with a rather slender obtuse apex; male spikes 3–5–7, crowded at the apices of the stems, surrounded by lanceolate, patent, spotted spathes, subglobose, each about ⅓ inch long and broad; bracts broadly ovate, subulate-mucronate, coriaceous, reddish, with a pale mucro, the lowest empty; exterior perianth-segments linear-oblong, mucronulate; anthers linear apiculate; female spikes 3–7, aggregate, each ⅓ inch long, linear-oblong, 1-flowered, spathes and bracts as in male, perianth-segments hyaline, small, obtuse; ovary oblong, tuberculate, surmounted by an undulate cup-shaped disc; styles two, thick, linear-lanceolate, coalescing at the base into a stylopod.

Roadside near Hout Bay. June–July, *Wolley Dod*, 2644, 2645. ♂ et ♀. *Dr. Thom*, in herb. Hook., under number 1060 ♂, wrongly referred to *H. albo-aristatus*.

Perhaps too near *H. rugosus*, but differing in its bracts being less abruptly acuminate, the apex longer and paler, the segment of the female perianth more obtuse, and the epigynous disc being cup-shaped.

H. Dodii Masters, sp. n. Stems ascending from a creeping rootstock, about 6 inches high, slender, simple, subcompressed, obsoletely rugulose; sheaths at the base of the stem about 1½ inch long, tightly convolute, coriaceous, with a rather slender longly foliaceous-mucronate apex; the others about ¾ inch long, without a mucro; male spikes . . . . , female 1–2, spicately arranged at the apex of the stem, each about ½ inch long, enclosed at the base by a lanceolate coriaceous spathe, membranous at the edges; perianth-segments six, linear-lanceolate, membranous, equalling the transversely rugulose fusiform-cylindrical ovary; styles two, fruit indehiscent, unilocular.

Sternberg Plateau. July, *Wolley Dod*, 2720.

Distinguished from its allies by its elongate perianth.

NOTES ON THE FLORA OF SUSSEX.

By C. E. Salmon.

Of late years little seems to have been put on record regarding Sussex botany, but that it is a rich county containing many interesting species no one can deny. The following notes are compiled from specimens and lists kindly supplied by friends and from my own observations, and I trust others may supplement them with further information respecting the plants of the county.

In 1875, Mr. W. Botting Hemsley, F.R.S., published in the *Journal of Botany* "An Outline of the Flora of Sussex," with an Appendix to the same in the following year. Twelve years afterwards appeared the Rev. F. H. Arnold's *Flora of Sussex*, necessarily repeating much of the information given by Mr. Hemsley, but strangely omitting some of his records with no very apparent reason—for example, *Helleborus viridis* is omitted in the later flora, in Division III., whereas Mr. Hilton tell me it still grows in the locality of Borrer, which Mr. Hemsley quotes for that division. Mr. Hemsley has kindly allowed me to take extracts from his private letters and manuscripts relating to Sussex botany, and these have supplied some interesting localities. A copy of Arnold's *Flora*, once in the possession of Mr. F. C. S. Roper and annotated by him, has also been the means of supplying some hitherto unpublished localities, and also of correcting several misleading records to be found in that *Flora*.

I have endeavoured, in the following list, not to repeat localities already to be found in print, and have rejected, as far as I was able, any that can be found in the *Journal of Botany* from 1883 to the present time, Syme's *English Botany*, 3rd edition, Watson's *New Botanist's Guide*, W. Moyle Rogers's *Handbook of British Rubi*, or W. B. Hemsley's "Outline of the Flora of Sussex."

The warm South Coast seems to be particularly favourable to many plants that have but recently gained a footing in England, and several are evidently on the increase there—as *Rapistrum*, *Malva borealis*, *Melilotus arvensis*, etc. Mr. S. T. Dunn has kindly examined and named all these alien species; and I am also greatly indebted to the Rev. W. Moyle Rogers, who has named all the Brambles. Messrs. H. & J. Groves, W. H. Beeby, A. Bennett, H. W. Pugsley, F. Townsend, and Revs. E. S. Marshall and E. F. & W. R. Linton have also very kindly assisted in naming the more critical forms.

The following is the list of observers (whose initials appear amongst the records) who have favoured me with notes and specimens:—

E.N.B.	Rev. E. N. Bloomfield.	T.H.	T. Hilton.
A.J.C.	A. J. Crosfield.	W.B.H.	W. B. Hemsley.
E.E.	Rev. E. Ellman.	R.	F. C. S. Roper.
E.H.F.	E. H. Farr.	E.S.S.	E. S. Salmon.
H.H.	H. Hemmings.	My own records have no initials.	

The sign ! after a locality indicates that I have either seen the plant growing there, or a satisfactory herbarium example. An asterisk is placed before the name of species or variety when such is believed to be a new record for either East or West Sussex; when placed before a *number*, it indicates an additional district to those mentioned in Arnold's *Sussex Flora*, to which the numbers refer. Plants considered to be introduced are distinguished by the sign †.

Any notes upon Sussex plants would be gratefully received, as I hope from time to time to publish records for the county collected together in this way. The most interesting records in the present paper are, I think, those of *Vicia gracilis*, *Peucedanum palustre*, *Galium sylvestre* and *anglicum*, *Salicornia appressa*, *Potamogeton rutilus*, and *Tolypella prolifera*.

Thalictrum flavum L. II. By the Arun, below Pulborough Bridge, 1899; A. J. C. & C. E. S. IV. Abundant in a swampy place near Bishopstone Mills! 1895; T. H.

Adonis autumnalis L. IV. Cultivated land, Telscombe; many years up to 1900; T. H.

Ranunculus circinatus Sibth. III. Henfield Common! Babington in Holmesdale N. H. Club Herb., Reigate.

R. trichophyllus Chaix. III. Ditch, Coombe! 1900; T. H. V. Pond by the road between Battle and the Union, 1895; E. S. S.

*_R. heterophyllus_ Web. I. Near Fishbourne Pond! 1897. Sidlesham Mill! 1898; T. H. II. Highdown Hill! 1897; T. H. III. Fulking, in ponds! T. H. The last locality is in Sussex E., and is apparently new to that vice-county.—Var. *_submersus_ (Hiern). III. Pond near the Adur, Beeding! 1899; T. H.

R. Baudotii Godr. *III. Ditches near "The Pad," Lancing! 1897; T. H. *IV. Fresh-water pond, Falmer! 1900; T. H. *V. Bexhill! 1882; H. T. Mennell.—Var. *confusus* (Godr.). V. Cuckmere Haven! 1897; T. H. "This has very long stamens, and is much like form labelled *confusus* Godr. by Syme and others"; H. & J. G.

R. lutarius Bouvet. *IV. Chailey Common, 1900; T. H. & C. E. S. V. Dicker; E. E. Pond, Catsfield Green, near Battle, 1895; E. S. S.

R. Lenormandi Schultz. VII. Ashdown Forest. Copthorne Common, 1891.

R. Flammula L. var. *pseudo-reptans* Syme. *IV. Tilsmere Wood, Heathfield; E. E.

R. Lingua L. V. Berwick; E. E.

R. sardous Crantz. V. Great Park Farm, Battle, 1895; E. S. S. —Var. *_parvulus_ (L.). III. Lane near "The Blue Idol," Thakeham, 1886 and again in 1894; A. J. C.

R. parviflorus L. *IV. Seaford; E. E.

*_Helleborus fœtidus_ L. III. Wood, foot of Ditchling Beacon, towards Clayton, in v.-c. 14! H. H. & A. J. C. VI. Near Robertsbridge (Andrews); E. N. B. in litt. to W. B. H., 1881.

†*Eranthus hyemalis* Salisb. *III. Established in Clayton Rectory hedge, a garden escape; H. H.

Aquilegia vulgaris L. II. Between Faygate and Kingsfold, 1892. IV. Downs above Berwick, possibly introduced; E. E. V. Beachy Head; R. VII. Tilgate Forest, 1891, where it is undoubtedly native, and thus the mark in Top. Bot. (against v.-c. 14) indicating doubt as to this point may be removed.

Berberis vulgaris L. III. Shipley; E. E.

Papaver Rhœas L. var. **strigosum* (Boenn.). III. Between Patcham and Saddlescombe, 1895; A. J. C. V. Eastbourne, towards Beachy Head, 1892.

P. dubium L. var. **Lecoqii* (Lamotte). II. Between Amberley Mount and Camp Hill, 1899. Additional to v.-c. 13; A. J. C. & C. E. S. III. Clayton and Preston; H. H. Fulking! 1894; T. H. Omit Mr. Ellman's record in Arnold's *Sussex Flora*.

P. hybridum L. *II. Between Amberley Mount and Camp Hill, 1899; A. J. C. & C. E. S. IV. Roadside towards Bishopston Church, 1896; H. H.

Fumaria pallidiflora Jord. V. Old wall, Wartling! 1897; T. H.

**F. Boræi* Jord. III. Henfield! 1838; Sp. in Holmesdale N. H. Club Herb., Reigate. New to v.-c. 13. *IV. Uckfield! 1896; T. H. V. Near Great Tanner's Farm, near Horeham Road, 1892.

F. muralis Sonder. V. Pevensey Castle grounds! 1895; T. H. "A luxuriant form of *muralis*, I think"; H. W. Pugsley.

F. densiflora DC. *III. Cultivated land about Brighton, not uncommon! 1899; T. H. IV. Near Berwick; E. E.

**F. parviflora* Lam. III. Cultivated land, Stanmer Park! 1899; T. H. New to v.-c. 14.

Nasturtium palustre DC. *V. Berwick; E. E.

Arabis hirsuta Scop. III. Plentiful on Race-hill, Brighton; H. H. Henfield; H. H. IV. Near Stanmer Park and Upper Pit, Offham; H. H. — Var. *glabrata* Syme. V. Downs south of Berwick; E. E.

Cardamine amara L. V. Stream between Lower Beech Farm and the Workhouse, Battle, 1895; E. S. S.

C. impatiens L. II. Warnham; E. E. III. Southwater; E. E.

C. bulbifera R. Br. II. Near Faygate, 1892.

†*Alyssum incanum* L. IV. Berwick; E. E.

†*A. calycinum* L. *III. Shipley; E. E.

Erophila brachycarpa Jord. (*præcox* DC.). *III. Aldrington beach! 1897; T. H. *IV. Downs near Telscombe! 1898; T. H.

E. virescens Jord. IV. Downs above Lewes, 1900. "I think best under *virescens*"; E. S. Marshall.

†*Hesperis matronalis* L. III. A considerable quantity on a bank by the roadside near Bolney! 1892; T. H.

*†*Eruca sativa* Lam. III. Casual from cornmill waste, Southwick! 1896; T. H.

Sisymbrium Sophia L. V. Shingles, Eastbourne; E. E.

*†*S. Columnæ* Jacq. III. Introduced with cornmill waste, Southwick Cliff! 1891; T. H.

*†*S. pannonicum* Jacq. VII. Track in meadow near Hammer Pond, Three Bridges, 1893.

Erysimum cheiranthoides L. *IV. Berwick; E. E. Twice by

Ouse beyond Lewes, casual; H. H. No personal authority for Sussex E. in Top. Bot.

†*E. perfoliatum* Crantz (*orientale* R. Br.). III. Casual, Sompting! 1892; T. H.

*†*E. repandum* L. III. On cornmill waste, Fishersgate! 1894; T. H.

†*Camelina sativa* Crantz. *IV. Berwick; E. E. V. Eastbourne! 1885; A. J. C.

Brassica oleracea L. V. Omit the Pevensey Sluice record; R.

*†*Bunias orientalis* L. III. Sandpits between Hassocks Station and London Road, apparently well established! 1896–7; T. H.

*†*Neslia paniculata* Desv. III. Sandpits, Hassocks! 1898, and Aldrington Quay! 1895; T. H.

Coronopus didymus Sm. *II. Arundel, 1899; A. J. C. & C. E. S.

Lepidium ruderale L. *I. By the watermill, Birdham, abundant, 1897–8; T. H. *III. Southwick; H. H. Fishersgate; T. H. *V. Plentiful near Gas-works, Bexhill, 1894. Omit the Eastbourne record; R.

†*L. Draba* L. *III. Rottingdean! 1894–1900; T. H.

*†*L. perfoliatum* L. III. Casual, Aldrington Quay! 1894; T. H.

*†*L. virginicum* L. III. Mill waste, Southwick! 1894; T. H.

Thlaspi arvense L. *VI. Ore (Andrews); E. N. B. in litt. to W. B. H., 1881.

Iberis amara L. V. Abundant on the shingles about two miles east of Eastbourne! 1895; T. H.

Teesdalia nudicaulis R. Br. *IV. Balcombe; W. B. H.

†*Isatis tinctoria* L. *III. Hollingbury Hill, casual with clover, from 1893–5! T. H.

Crambe maritima L. V. Shingle between Bexhill and Pevensey Sluice, 1895; E. S. S.

*†*Rapistrum rugosum* All. III. Cultivated land on road to the Dyke, Brighton! 1895; T. H. V. Eastbourne! 1885; A. J. C.

*†*R. orientale* DC. III. Casual, bank by the Adur Inn, Shoreham Road! 1897; T. H. Aldrington and Ditchling; E. E.

**Raphanus maritimus* Sm. III. By Canal near Southwick; H. H. Unrecorded for v.-c. 13 in Top. Bot.

Viola palustris L. VII. Cut and Lie Wood, near Copthorne, 1900; H. Groves & C. E. S.

V. hirta × *odorata*. *III. Clayton! 1897; T. H.

V. silvestris Reich. *III. Abundant on north edge of Downs near Brighton; H. H. V. Common in the Battle district, 1895; E. S. S.—f. **leucantha* G. Beck. III. Saddlescombe! 1899; T. H.

**V. Riviniana* × *ericetorum*. VII. Pot Common, Copthorne, 1896.

V. lactea Sm. *IV. Chailey Common, 1900; T. H. & C. E. S. VII. Crowborough! 1895; A. J. C. Copthorne Common, 1891.

**V. ericetorum* × *lactea*. VII. Crowborough! 1895; A. J. C. Copthorne Common, 1892.

V. tricolor L. *V. Near Lunsford Cross; E. S. S. Great Park Farm, Battle, and in a field near Netherfield, 1895; E. S. S. VI. Field between Westfield and Beauport Park, 1895; E. S. S. Old Mill Farm, near Mayfield, 1892.

Polygala oxyptera Reichb. *III. Downs between Hodshrove and Bevendean! 1900; T. H. IV. Plumpton; E. E. VI. Petley Wood, 1894.

**P. calcarea* F. Schultz. III. Piecombe; H. H. This is in West Sussex, v.-c. 13, where it is unrecorded in Top. Bot.

Dianthus deltoides L. *III. Hassocks, East Sussex, 1899; T. H.

*†*Saponaria Vaccaria* L. V. Great Park Farm, Battle, 1895; E. S. S.

Silene Cucubalus Wibel. var. **puberula* Syme. III. Brighton, 1884; A. J. C.

**S. conica* L. IV. Telscombe, v.-c. 14, 1888-9; T. H.

S. anglica L. *IV. Telscombe! 1897; T. H. VII. Tilgate; E. E.

S. noctiflora L. III. Between Patcham and Saddlescombe, 1895; A. J. C. An interesting record, showing the survival of the plant in the same locality as Hemsley notes in his "Outlines"—"Seedlescombe, near Poynings, 1814; Herb. Borrer. Not reported since."

Cerastium quaternellum Fenzl. *IV. Berwick Common; E. E. V. Willingdon Hill; E. E.

C. arvense L. III. Road in Patcham parish leading from London Road to Ditchling Road; A. J. C. *IV. Field near Ashcombe, plentiful; H. H. Hills west of Alfriston; E. E.

Stellaria aquatica Scop. IV. New Barbcombe; H. H. In very dry gravel at Berwick Rectory; E. E. *V. Cuckmere down to Arlington; E. E.

S. media Cyr. var. **Boræana* (Jord.). III. By the Canal, Fishersgate! v.-c. 13, 1895; T. H.

S. palustris Retz. IV. Near Hayward's Heath, near Ouse Viaduct; H. H.

Arenaria tenuifolia L. *III. Downs, Stanmer! E. M. Day.

Sagina ciliata Fr. III. Downs near Bevendean! 1896; T. H. *VII. Roadside near Ashurst Wood, East Grinstead, 1894.

†*Claytonia perfoliata* Donn. *IV. Plumpton; E. E.

Montia fontana L. III. Ditchling Common; H. H. — Var. **repens* Pers. IV. Top of Firle Beacon; E. E. Chailey Common, 1900.—Var. *erecta* Pers. *IV. Berwick Common; E. E.

Elatine hexandra DC. IV. Great Pond, Piltdown! 1900; T. H.

Hypericum Androsæmum L. III. Near Hayward's Heath; H. H. IV. Near Chailey Common; H. H. Between Balcombe Station and Whitehouse Farm, 1896. V. Near Ashburnham Park and Catsfield, frequent, 1895; E. S. S.

H. dubium Leers. IV. Chailey Bog; E. E. *VI. Heathfield and north of Frant; E. E. *VII. Near Felbridge and about East Grinstead, frequent, 1895.

H. elodes L. III. Pond on Ditchling Common; H. H.

*†*Malva borealis* Wall. *III. Waste places between Patcham and Standean! 1899; T. H. Broadmere Common, Henfield! 1894; T. H. Shipley; E. E. *IV. Plumpton and Berwick; E. E. V. Waste ground near Horeham Road Station, 1892. Previously unrecorded for West Sussex.

Tilia cordata Mill. *IV. Between Balcombe and Ardingly, 1893; A. J. C.

Radiola linoides Roth. V. Between Little Common and the sea, 1895. VI. Eridge and Heathfield; E. E.

Linum angustifolium Huds. *II. Rusper; E. E. III. Near Roedean, near Rottingdean; J. L. Warren in litt. to W. B. H., 1874. VI. Mayfield; E. E.

†*Geranium phæum* L. III. Known for years in a dry ditch by the entrance to Wiston Park! 1883; T. H.

G. pratense L. III. Railway embankment north of Hassocks Station, East Sussex; T. H. IV. Marshes above Lewes; E. E.

G. pyrenaicum Burm. fil. *III. Chalk mounds, Pangdean; T. H. Henfield, abundant; perhaps escaped, with *G. lucidum*, from Borrer's old garden; H. H. Near Patcham; H. H. IV. Railway near Lewes; E. E. *VII. Near Three Bridges Station, 1898.

*†*G. rotundifolium* L. IV. Casual, Seaford; E. E.

G. columbinum L. II. Washington Common; E. E. III. Path to Ovingdean and Race Hill, Brighton; H. H. IV. Buxted; E. E.

G. lucidum L. III. Side of London Road, Hassocks; perhaps originally an escape, but spreading gradually on a bank near Station; H. H. *IV. Uckfield; E. E. *VII. Sandy bank, East Grinstead, 1895.

Erodium cicutarium L'Hérit. var. **chærophyllum* (Cav.). IV. Newmarket Hill, Brighton! 1899; T. H.

*†*Impatiens parviflora* DC. III. Henfield! 1893; T. H. IV. Uckfield, roadside; T. H.

Rhamnus catharticus L. II. Copse on Downs near Amberley, 1899; A. J. C. & C. E. S.

*†*Trigonella cærulea*. III. Fishersgate! 1892; T. H.

*†*Medicago falcata* L. III. Near Custom House, Kingston-by-Sea! and on cliff, Fishersgate! 1890; T. H. IV. Bishopstone Tide-mills; E. E.

M. denticulata Willd. III. Kingston Beach; H. H. IV. Seaford! 1845; Herb. R. Pryor.

†*Melilotus arvensis* Wallr. III. Aldrington and Kingston Lighthouse; H. H. *IV. Seaford and Telscombe; E. E. V. Pits near the gas-works, Bexhill, 1894.

*†*M. indica* All. III. Aldrington Beach! 1894, and cultivated land, Saddlescombe! 1899; T. H.

Trifolium squamosum L. IV. Plumpton; E. E. V. Cuckmere Haven; E. E.

T. striatum L. IV. Berwick Common; E. E.

T. scabrum L. V. Hills south of Berwick; E. E.

T. glomeratum L. VI. Near Camber Castle! 1897; T. H.

*†*T. resupinatum* L. III. Abundant by the road near the Station at Henfield! 1894; also, as a casual, near the Custom House, Kingston-by-Sea! 1889; T. H.

T. filiforme L. III. Hassocks and Henfield; H. H. IV. Plumpton; E. E.

Anthyllis Vulneraria L. var. *coccinea* L. IV. Downs at Telscombe! and near Hervey's Cross! 1900; T. H.

Lotus tenuis W. & K. III. Ditchling Common; H. H. Between Shoreham and Worthing; J. L. Warren in litt. to W. B. H., 1874. IV. Levels towards Iford; H. H. V. Chiddingly; E. E.

Astragalus glycyphyllos L. I. Bury Hill; T. H.

Ornithopus perpusillus L. IV. Berwick Common; E. E. V. Great Park Farm, Battle, abundant, 1895; E. S. S.

Vicia gemella Crantz, var. **tenuissima* Druce. V. Near Battle, 1895.

**V. gracilis* Loisel. III. Thakeham! 1876; A. J. C. Jender's Farm, Shipley! 1888; E. E. Additional to v.-c. 13.

V. lathyroides L. VI. Camber! E. N. B. in litt. to W. B. H., 1882.

†*V. bithynica* L. III. Cultivated land near Stanmer! 1898–9; T. H.

*†*V. pannonica* Jacq. and *V. peregrina*. III. Cultivated land, Stanmer Park! 1899–1900; T. H.

Lathyrus Nissolia L. III. North of Hassocks, near Railway; T. H. Shipley; E. E. Roadside between Coneyhurst and Billingshurst, 1899; A. J. C. IV. Roadside between Coneyburrows and Chailey; H. H. V. Border of wood between Mountfield and Battle, 1894. VI. Mayfield; E. E. Rye, 1900. VII. Between Crawley and Ifield, 1897.

*†*L. hirsutus* L. III. Cultivated land near Stanmer! East Sussex, 1898–9; T. H.

L. sylvestris L. II. Between Bury and Houghton, 1899; A. J. C. & C. E. S.

L. maritimus Bigel. III. One plant found pulled up and thrown down again in 1892 near Kingston Lighthouse; H. H.

†*Prunus domestica* L. III. Near Bramber Station; H. H.

Rubus idæus L. *III. Abundant above Bevendean, also at Wolstonbury; H. H. IV. Downs between Falmer and Plumpton; H. H.

R. plicatus W. & N. *IV. By Newick Station; T. H. — Var. *hemistemon* (P. J. Muell.). IV. Uckfield; E. H. F. — Var. **Bertramii* G. Braun. II. Wiggenholt Common! 1900; T. H.

R. holerythros Focke. IV. Uckfield; E. H. F. VII. Ashdown Forest, near Wychcross; T. H.

R. carpinifolius W. & N. *IV. Uckfield; E. H. F.

**R. Lindleianus* Lees. IV. Uckfield, East Sussex, v.-c. 14; E. H. F.

R. pulcherrimus Neum. II. Storrington; T. H. IV. Wivelsfield; T. H. Uckfield; E. H. F.

R. dumnoniensis Bab. III. Hollingbury Camp! 1900; T. H. IV. Downs, Seaford; T. H. V. Hurstmonceux Park; T. H.

R. mercicus Bagnall, var. *bracteatus* Bagnall. IV. Uckfield; E. H. F.

**R. gratus* Focke. IV. Uckfield, v.-c. 14; E. H. F.

R. argentatus P. J. Muell. III. Stanmer Park and hedge, Wiston; T. H. IV. Uckfield; E. H. F. Roadside near Chailey! 1900; T. H.

R. pubescens Weihe, var. *subinermis* Rogers. IV. Uckfield; E. H. F.

R. macrophyllus var. *Schlechtendalii* (Weihe). IV. Uckfield; E. H. F.

R. micans G. & G.
**R. hirtifolius* M. & W. } IV. Uckfield; E. H. F.
R. pyramidalis Kalt.

R. leucostachys Schleich. III. Stanmer Park; T. H.

R. Gelertii Frider. III. Stanmer Park and on the Downs above Pangdean; T. H. IV. Woods by Newick Station; T. H.

R. anglosaxonicus Gelert. III. Wiston; T. H. IV. Uckfield; E. H. F.

R. echinatus Lindl. III. Race-hill, Brighton; T. H.

R. Babingtonii Bell Salt. IV. Uckfield; E. H. F. VI. By ditch between Rye and Winchelsea, 1900; T. H. & C. E. S.

R. ericetorum Lefv. IV. Novington Lane, Plumpton! 1900; T. H. "I think a shade-grown form of it"; W. M. R.

R. fuscus W. & N.
R. serpens Weihe. } IV. Uckfield; E. H. F.
R. britannicus Rogers.

R. Balfourianus Blox. IV. Wivelsfield and near Chailey Station; T. H.

Potentilla argentea L. II. Roadside between Washington and Storrington, abundant; T. H. *III. Kingston Lighthouse, seen since 1892, but now (1899) lost; H. H.

P. palustris Scop. *IV. Chailey Bog; E. E.

Alchemilla vulgaris L. IV. Near Horstead Keynes Station; E. E. VII. Near Turner's Hill; R. Near Dunning's Mill, East Grinstead, 1895.—Var. *alpestris* (Schmidt). IV. The "Hendle Wood" plant (of Arnold's *Sussex Flora*) is pronounced to be this form by the Rev. E. F. Linton.—Var. **filicaulis* (Buser). II. St. Leonards Forest! 1866; W. B. H. Recorded here in the *Sussex Flora* under the aggregate name.

Agrimonia odorata Mill. *II. Road from Storrington to Thakeham! 1898; T. H. Rusper; E. E. III. Shipley; E. E. IV. Plumpton; E. E. V. East Hoathly; E. E. Between Catsfield Green and Marlpits, Ninfield, 1895; E. S. S.

Rosa tomentosa Sm. III. Newtimber! 1893; T. H.

R. canina L. var. *frondosa* (Steven). *III. Newtimber Hill! 1896; T. H.—Var. *dumetorum* (Thuill.). *III. Partridge Green! 1898; T. H.

R. glauca Vill. var. **coriifolia* (Fr.). III. Road from Cowdown to Newtimber! 1894; T. H.

Pyrus torminalis Ehrh. III. Hedgerow, parish of Thakeham, 1899; A. J. C. *VII. Near Ifield (Ellman); E. N. B. in litt. to W. B. H., 1882.

P. Aria Ehrh. III. Wolstonbury and near Clayton Holt; H. H. IV. Lewes and Alciston; E. E.

P. communis L. III. One tree beyond Patcham; H. H. Shipley; E. E. *V. South of Alfriston; E. E.—Var. **Achras* (Gaert.). III. Chalk-mounds, Pangdean! 1894; T. H. Near "Blue Idol," Thakeham, 1899. Seen there thirty years; A. J. C.

P. Malus L. III. Clayton Bridge and towards Hassocks by path. Near Ditchling Common. Between Burgess Hill and Cuckfield. Between Ashurst and Steyning. Henfield; all H. H.—Var. **acerba* DC. VII. Wood near Hammerwood, Forest Row, 1898.

*†*P. Acanthus.* V. Above Wilmington; E. E.

P. germanica Hook. fil. *III. Hedgerow, parish of Thakeham, 1899; A. J. C. V. Crowhurst, 1895; E. S. S. VI. Mayfield; E. E.

*†*Saxifraga Geum* L. V. Plantation at Ratton! 1879; R.

Chrysosplenium oppositifolium L. V. Abundant in the Battle and Catsfield neighbourhood, 1895; E. S. S.

Ribes Grossularia L. *III. Clayton; H. H,

R. rubrum L. var. †*sativum* (Reichb.). *III. One bush near Dyke stream; H. H. Shipley; E. E. *IV. Plumpton; E. E. — Var. *†*petræum* (Sm.). VII. Amongst shrubs, near a stream, in a hollow near Crowborough! 1895; E. H. F. & T. H.

R. nigrum L. III. One bush in Clayton Holt, now gone; H. H. Shipley; E. E. *IV. Plumpton; E. E. VII. Forest north of Pease Pottage, 1879 (Ellman); E. N. B. in litt. to W. B. H., 1882.

*†*Sedum rupestre* L. III. Established outside Borrer's old garden at Henfield; H. H.

Drosera intermedia Hayne. VII. Copthorne Common, 1891.

Hippuris vulgaris L. II. Between Amberley and the Ferry, 1899; A. J. C. & C. E. S.

Myriophyllum alterniflorum DC. *IV. Plumpton; E. E. *VII. Pond, Colman's Hatch, 1896.

Callitriche hamulata Kuetz. *IV. Chailey Common! 1900; T. H. — Var. *pedunculata* (DC.). *IV. Great Pond, Piltdown! 1900; T. H. A form only, evidently; long-stalked and sessile fruits occur on the same plant.

Peplis Portula L. *IV. Chailey Common; H. H.

Epilobium angustifolium L. II. Camp Hill, near Amberley, 1899; A. J. C. and C. E. S. III. Clayton Holt; H. H. VII. Railway banks about Rowfant, also near Felbridge, 1895.

E. roseum Schreb. *II. West Chiltington and Horsham; E. E. IV. Plumpton; E. E.

E. obscurum Schreb. IV. Roadside near Newick! 1900; T. H.

Conium maculatum L. III. Henfield; H. H.

Smyrnium Olusatrum L. IV. Frequent by roadsides from Southerham to Glynde pit; H. H.

Bupleurum rotundifolium L. *III. Shoreham! 1863; ex herb. W. B. H.

B. tenuissimum L. IV. Near Newhaven! herb. R. Barrington. V. South of Berwick Common; E. E.

Apium nodiflorum Reichb. fil. var. **ocreatum* Bab. IV. Chailey Common! T. H.

*†*Ammi majus* L. V. Casual, Eastbourne; E. E.

Carum segetum B. & H. IV. Southease. V. Hooe Levels, abundant, 1894.

†*C. Carui* L. *II. Lower Beeding; E. E. *IV. Seaford; E. E.

Sium latifolium L. IV. Laughton Levels; E E.

S. erectum Huds. III. Clayton and Old Shoreham; H. H.

Ægopodium Podagraria L. III. Near Steyning; H. H. IV. Near Hayward's Heath; H. H.

Pimpinella major Huds. V. Wilmington Holt, east of Folkington; E. E.

Anthriscus vulgaris Bernh. *VI. Camber Sands; T. H.

Fœniculum vulgare Mill. III. Cliffs near Southwick, and near the 'Pad Inn,' Old Shoreham; H. H.

Crithmum maritimum L. V. Shingles, Eastbourne; E. E.

Œnanthe pimpinelloides L. VI. Winchelsea! ex herb. W. B. H.

Œ. Lachenalii C. Gmel. IV. Inland near Alciston; E. E.

Œ. Phellandrium Lam. *II. Amberley Wild Brooks and ditches by the Arun, Pulborough, 1899; A. J. C. & C. E. S. V. Wartling Wood, near Hurstmonceux Castle; roadside between Ninfield and Boreham Street; Hooe Level, 1895; E. S. S. VII. Ifield Mill-pond, 1898.

**Peucedanum palustre* Moench. V. Marsh, Hurstmonceux Park, abundant! 1899; G. C. Druce & T. H. See Bot. Ex. Club Rep. 1899, p. 606.

*†*Coriandrum sativum* L. V. Eastbourne; E. E.

*†*Caucalis latifolia* L. and †*daucoides* L. III. Near Custom House, Kingston-by-Sea! 1900; T. H.

C. arvensis Huds. III. Roadside between Southwick and Portslade-on-Land; H. H.

C. nodosa Scop. IV. Hamsey; H. H. V. Pevensey Level to Bexhill, abundant, 1894.

Sambucus nigra L. var. *laciniata* L. *IV. Berwick, doubtfully native; E. E.

S. Ebulus L. IV. Under Firle Beacon, Blatchington; E. E.

**Lonicera Xylosteum* L. V. Wilmington Holt; E. E. This plant is an addition to East Sussex v.-c. 14; Borrer's old records for it, near Amberley, are in West Sussex, where it still exists in several copses where it might well be native. This East Sussex locality would seem to be also a station of a similar character.

Galium erectum Huds. *IV. Cultivated land, Wivelsfield! 1895, and pit near Seaford! 1900; T. H. *V. Foot of the Downs at the west end of Motcombe Lane, west of the workhouse, Eastbourne! 1888; R. *VI. In a meadow, Fairlight! 1876; E. N. B. (The plants recorded in Arnold's *Sussex Flora* from Districts V. & VI. are but *mollugo* forms.)

G. Mollugo × *verum* (*ochroleucum* Syme). *IV. West of Alfrisson; E. E.

**G. sylvestre* Poll. III. Clayton! Sussex West, 1893; H. H. An interesting record of a plant found in Surrey, but absent apparently from the adjoining counties of Kent and Hampshire.

G. uliginosum L. III. Near pond, Clayton; E. Sussex; H.H.

**G. anglicum* Huds. IV. In two localities, some way apart, on fallow land, and a steep hillside, to the west of Alfriston! E. E. A new plant to Sussex.

G. tricorne Stokes. III. Corn-field near Billingshurst, 1899; A. J. C. IV. Hamsey; H. H.

**Valeriana Mikanii* Syme. II. Copse on Amberley Mount, West Sussex, 1899; A. J. C. & C. E. S.

V. sambucifolia Willd. *III. Henfield Levels! 1894; H. H.

†*Centranthus ruber* DC. *III. Abundant on chalk cliffs by London Road Railway Station, Brighton; H. H. Old brick-kiln near Broadmere, Henfield; H. H. *V. Eastbourne; R.

Valerianella dentata Poll. *VII. Field near Grange Road Station, 1895.—Var. **mixta* Dufr. III. Stanmer Park! 1895; T. H. IV. Near Newick Station! 1894; T. H.

Dipsacus pilosus L. *III. West Grinstead; E. E.

*†*D. fullonum* Mill. IV. Berwick; E. E.

Erigeron acre L. IV. Near Falmer; H. H.

Filago spathulata Presl. III. Given for this district, with no further localization, in Arnold's *Sussex Flora.* The label on the specimen in the Brighton Museum runs—"Broadwater Common, near Worthing, 1873."

F. minima Fr. III. Hassocks; lost by building, but may turn up near; H. H. IV. Above Piddinghoe; E. E. VII. Tilgate; E. E.

Gnaphalium uliginosum L. Omitted by mistake from Arnold's *Sussex Flora;* reported from all the districts in Hemsley's "Outlines."

G. sylvaticum L. V. Abbots Wood; E. E. Farthing Woods, 1895; E. S. S. VI. Heath near Cade Street, and on Old Mill Farm near Mayfield, 1892. VII. Near Felbridge, 1895.

†*Inula Helenium* L. III. Side of lane in Thakeham parish, 1889; A. J. C. IV. Berwick; E. E. *VI. Heathfield; E. E.

I. crithmoides L. I. Near Prinstead! 1881; F. H. Arnold.

Pulicaria vulgaris Gaertn. *II. Near Parham; E. E.

*†*Xanthium spinosum* L. III. South of Custom House, Kingston-by-Sea! 1900; T. H.

Bidens tripartita L. III. Ditchling Common and Broadmere, Henfield; H. H. IV. Ditches near Southover Priory, and at Barcombe; H. H.

Achillea Ptarmica L. III. Roadsides, Thakeham; A. J. C. IV. Chailey Common; H. H.

Anthemis arvensis L. III. Withdean; H. H.

Chrysanthemum segetum L. IV. Ouse near Lewes (casual here); H. H.

†*C. Parthenium* Pers. III. Near Steyning, 1884; H. H.

*†*Matricaria discoidea* L. IV. Lewes; E. E.

Tanacetum vulgare L. III. Patch by Ockley Lane, Keymer; H. H.

*†*Ambrosia artemisifolia* L. III. Fishersgate! 1900; T. H.

Petasites officinalis Moench. *IV. Firle; E. E.

Senecio sylvaticus L. III. Hassocks; H. H. IV. Hayward's Heath Common; H. H.

S. viscosus L. *V. Shingles, Eastbourne; E. E.

S. aquaticus Huds. III. Henfield; H. H. *VI. Mayfield; E. E. *VII. Ifield; E. E.

Arctium intermedium Lange. *III. Near Roedean, near Rottingdean; J. L. Warren in litt. to W. H. B., 1874.

Carduus pycnocephalus L. *IV. Near Alciston Pit; E. E.

C. crispus × *nutans*. *IV. Ashcombe! 1900; T. H.

Cnicus pratensis Willd. III. Henfield and Ditchling Commons; H. H. IV. Near Ouse Railway Viaduct beyond Hayward's Heath, and on Chailey Common; H. H. VI. Heathfield; E. E. VII. Ashdown Forest and on Copthorne Common, 1895.

Onopordon Acanthium L. *IV. Telscombe; T. H.

†*Mariana lactea* Hill. III. Hove, near nursery-grounds, 1899; H. H.

Serratula tinctoria L. II. Near Faygate, 1892. III. Ditchling Common; H. H. *VII. Between Grange Road Station and Hedge Court Mill, also near East Grinstead and about Three Bridges, 1895.

†*Centaurea Jacea* L. III. Abundant in a paddock between Hassocks and Hurstpierpoint! Doubtfully native, 1900; T. H.

C. Cyanus L. V. Great Park Farm, Battle, 1895; E. S. S.

C. Calcitrapa L. IV. Blatchington; E. E.

†*C. solstitialis* L. III. White-hawk Down and Roedean; T. H. V. West Dean and between Seaford and Alfriston; E. E.

Cichorium Intybus L. III. Hassocks (not seen recently) and Kingston Lighthouse; H. H. V. Great Park Farm, Battle, 1895; E. S. S.

Crepis fœtida L. *IV. Fallow land in two places between Seaford and Berwick! 1900; T. H. Newhaven; E. E.

C. taraxacifolia Thuill. *III. Cultivated land, Old Shoreham Road, Hove! 1897; T. H. *IV. Near Isfield! 1900; T. H. Seaford; E. E.

*†*C. setosa* Hall fil. VI. Mayfield, East Sussex; E. E.

C. biennis L. *VII. Field west of Furnace Wood, 1896.

Hieracium murorum L. III. Clayton! 1893; H. H.

**H. sciaphilum* Uechtritz. III. Chalk mounds, Pangdean! 1899; T. H. IV. Roadside near Horsted Keynes! 1899; T. H.

H. rigidum Hartm. IV. Isfield! 1899; T. H.—Var. *tridentatum* Fries. *III. Race-hill, Brighton! 1897; T. H. *IV. Copse near Chailey! 1895; E. H. F.

H. boreale Fr. III. Hassocks! 1899; T. H.

H. umbellatum L. III. Hassocks! 1898; T. H.

Lactuca virosa L. I. Arundel! 1866; W. B. H. *II. Amberley, 1899; A. J. C. & C. E. S.—*L. Scariola* L. is a very doubtful Sussex plant.

L. muralis Fresen. II. Amberley, 1899; A. J. C. & C. E. S.

†*Tragopogon porrifolius* L. *VI. Cliffs on the south side of Rye. (Henry Taylor; specimen) H. C. Watson in litt. to W. B. H.

*†*Campanula rapunculoides* L. III. Slope between Dyke Road and Preston Station! 1893 (now destroyed by building); H. H.

Specularia hybrida DC. *II. Near Amberley Mount, 1899; A. J. C. & C. E. S.

Hypopitys Monotropa Crantz. *IV. Lewes! 1843; herb. R. Pryor.

Hottonia palustris L. III. Shipley; E. E. V. Berwick; E. E.

Primula acaulis L. var. *caulescens* (Koch). III. Wiston; T. H. IV. Isfield and West Chiltington; T. H.

P. acaulis × *veris*. II. Stream-side between Faygate and Kingsfold, 1892. This, when fairly intermediate, differs considerably from the umbellate form of *acaulis*; in Arnold's *Sussex Flora* the two are seemingly confused.

Anagallis cærulea Schreb. *III. Near Saddlescombe, 1895; A. J. C. Shipley; E. E. *IV. Berwick; E. E. *V. Hailsham; E. E.

Samolus Valerandi L. V. About Pevensey Sluice, 1895.

Vinca minor L. VII. Roadside near East Grinstead, abundant, 1896.

Erythræa pulchella Fr. V. St. Leonards! herb. R. Barrington. *VI. Abundant in a meadow between Westfield House and Westfield, 1895; E. S. S.

E. capitata var. *sphærocephala* Towns. IV. Rottingdean, 1894; T. H.

Gentiana Pneumonanthe L. VII. Between Chelwood Gate and Wych Cross, 1898.

G. campestris L. V. Hills south of Berwick; E. E.

Menyanthes trifoliata L. *VII. Near Colman's Hatch, Ashdown Forest; B. B. Gough.

Limnanthemum peltatum S. P. Gmel. IV. Laughton Levels; E. E. *VI. Mountfield, introduced, 1895; E. S. S.

†*Anchusa sempervirens* L. *II. Roadside between West Chiltington and Pulborough, 1883; A. J. C.

Lycopsis arvensis L. *V. Common in sandy fields about Catsfield, 1895; E. S. S.

Myosotis arvensis Lam. var. *umbrosa* Bab. *III. Wood near Ditchling! 1896; T. H.

Lithospermum officinale L. V. Darvel's Hole (Vores); E. N. B. in litt. to W. B. H., 1882.

L. arvense L. II. Between Bury and Houghton, 1899; A. J. C. & C. E. S.

*†*Echinospermum lappula* Lehm. III. Near Devil's Dyke; E. E. IV. Near the Harbour, Newhaven! 1900; T. H.

Cuscuta europæa L. IV. Berwick; E. E.

†*C. Trifolii* Bab. VI. Abundant in one field of clover at Guestling; E. N. B. in litt. to W. B. H., 1881.

[*Verbascum Lychnitis* L. Omit the record in District V. in Arnold's *Sussex Flora*.]

*†*Linaria purpurea* L. V. Found by Mr. Hailstone on the shingle at Eastbourne, 1834, sp. Dr. Bromfield MSS. H. C. Watson in litt. to W. B. H.

L. viscida Moench. II. Between Amberley Mount and Camp Hill, 1899; A. J. C. & C. E. S.

Sibthorpia europæa L. V. Hurstmonceux Park! 1899; T. H. Near Ashburnham; E. E.

Veronica scutellata L. *II. Amberley Wild Brooks, 1899; A. J. C. & C. E. S.

**Euphrasia Rostkoviana* Hayne. II. Washington Common! 1899; T. H. III. Stanmer Down! 1898; T. H. IV. West Chiltington Common! 1897, and Piltdown! 1900; T. H. New to East Sussex.

*_E. Kerneri_ Wettst. III. Stanmer Park! 1900; T. H, This is in v.-c. 14.

*_E. nemorosa_ H. Mart. I. Arundel! 1900; T. H. III. Woolstenbury! 1899, and Dyke Hills, Brighton! 1900; T. H. IV. Balmer! 1898, and Downs, Seaford! 1900; T. H. New to East Sussex.

E. gracilis Fr. *IV. Lane End Common! 1898; T. H.

Bartsia Odontites Huds. var. _verna_ (Reichb.). *III. White-hawk Down! 1882; T. H. *IV. Chailey; E. E.

Pedicularis palustris L. II. Amberley Wild Brooks, 1899; A. J. C. & C. E. C.

Orobanche major L. V. Abbots Wood; E. E.

O. elatior Sutton. IV. Path from Iford to the Downs! 1898; T. H. North of Seaford; E. E.

*_Lathræa squamaria_ L. III. Clayton! 1890; H. H. An addition to East Sussex, v.-c. 14.

Utricularia vulgaris L. V. Ditch between Pevensey and Hurstmonceux! 1899; T. H.

Mentha alopecuroides Hull. I. Kingsley Marsh, abundant, 1895.

*_M. longifolia_ Huds. IV. Ditch, Southease! 1895; T. H. New to v.-c. 14.

M. Pulegium L. III. Falmer Pond; E. E.—Var. *_erecta_ Syme. IV. Piltdown! 1896; T. H. Chailey Common, 1896.

*†_Melissa officinalis_ L. IV. Roadside, Southease! 1897, and near Horsted Keynes! T. H.

Nepeta Cataria L. V. Alfriston and Birling Gap; E. E. & C. E. S.

Marrubium vulgare L. *IV. By a farm near Glynde, 1900. V. Hills both sides of the Cuckmere Valley; E. E.

*†_Stachys annua_ L. III. Corn-field, Sheepcote Valley, Brighton! 1895; T. H.

†_Leonurus Cardiaca_ L. *V. Near Horeham; E. E.

Lamium hybridum Vill. III. Roadside ditch between Keymer and Ditchling! 1897; T. H.

Plantago lanceolata L. var. †_Timbali_ Reichb. fil. *III. Roadside, Upper Roedean! and Ditchling Road, Preston! T. H. *IV. Chailey Station; E. E. *V. Eastbourne! R.

Littorella juncea Berg. VII. Tilgate; E. E.

Scleranthus annuus L. var. *_biennis_ (Reuter). II. Wiggenholt Common! 1900; T, H. IV. Maresfield! 1891; T. H. VI. Camber Sands! 1897; T. H.

*†_Amaranthus retroflexus_ L. III. Southwick! and Hove! 1891; T. H. IV. Plumpton Station; E. E.

*†_Chenopodium opulifolium_ Schrad. III. Near Brighton; E. E. IV. Lewes and Newhaven; E. E.

C. ficifolium Sm. III. Goldstone Bottom, Hove! 1897; T. H.

C. murale L. *III. Roadside, Sompting! 1893; T. H. V. Cuckmere Haven! 1892; T. H. Alfriston; E. E.

*_C. hybridum_ L. III. Plentiful near Henfield! 1896; T. H. New to v.-c. 13.

C. urbicum L. *IV. Southease! 1893; T. H.—Var. *_intermedium_ Moq. II. Amberley; E. E. V. Exceat; E. E.

C. rubrum L. III. Saddlescombe! 1891; T. H. Shipley; E. E. *IV. Berwick; E. E. VI. Mayfield; E. E. — f. *pseudobotryoides* H. C. Wats. V. Exceat, 1900; E. E. & C. E. S.

Atriplex littoralis L. var. *serrata* Moq. *V. Shingles, Eastbourne; R.

A. Babingtonii Woods. III. Shoreham! 1899; T. H.

A. laciniata L. I. Climping Sands; E. E.

**Salicornia appressa* Dum. III. Shoreham! 1899; T. H. V. Cuckmere Haven! 1900; T. H. Records for both East and West Sussex.

Polygonum aviculare L. var. *rurivagum* (Jord.). III. Fishersgate! 1893; T. H. — Var. *microspermum* (Jord.). III. Lancing Road, Shoreham! 1900; T. H.

P. minus Huds. *II. Amberley Wild Brooks! 1900; T. H.

P. Bistorta L. *VII. Abundant in a meadow, Buckhurst Park, near Withyham (Proceedings, Holmesdale N. H. Club, 1881–83).

Rumex maritimus L. V. Pevensey Level! 1896; T. H.

R. limosus Thuill. IV. Southease! 1896; T. H.

R. pulcher L. *II. Frequent about Pulborough, 1899; A. J. C. & C. E. S.

*†*R. scutatus* L. III. On a garden wall, Fulking! Miss M. Robinson.

Daphne Mezereum L. *IV. Holt on the Downs, near Lewes! 1900; W. E. Nicholson.

D. laureola L. III. Nuthurst; E. E. *IV. Plumpton and Firle; E. E.

Euphorbia platyphyllos L. V. Near East Dean; E. E. VI. Fields near Cade Street and roadside near Old Mill Farm, near Mayfield, 1892. VII. Two places near Ifield (Ellman); E. N. B. in litt. to W. B. H., 1882.

*†*E. Cyparissias* L. III. Near Borrer's place, Henfield! 1892; H. H. IV. Railway bank near Lewes; E. E.

*†*E. Lathyris* L. *V. Near some pigstyes, Crowhurst, 1895; E. S. S.

Mercurialis annua L. var. *ambigua* (L.). *III. By road to Ditchling! and near Race-hill, Brighton! 1899; T. H. *IV. Lewes; E. E.

Carpinus Betulus L. III. Shipley; E. E.

Quercus sessiliflora (Salisb.). IV. Plumpton; E. E.

Salix triandra L. var. *Hoffmanniana* Sm. *III. Poynings! 1896; T. H.

S. purpurea L. III. Side of Old Shoreham Bridge, by the Lancing Road! 1896; T. H.

Populus tremula L. VII. Between Rusper and Ifield (Ellman); E. N. B. in litt. to W. B. H., 1882.

Juniperus communis L. III. Newtimber Hill; E. E. *V. Hills above Berwick; E. E.

Taxus baccata L. *IV. Near Plumpton Crossways; E. E. VI. Heathfield; E. E.

Hydrocharis Morsus-ranæ L. II. Amberley Wild Brooks; 1899; A. J. C. & C. E. S. V. Ditches about Combe Haven, 1895; E. S. S.

Malaxis paludosa Sw. II. St. Leonard's Forest; W. B. H. VII. Bog near Hartfield, 1895; E. S. S.

Neottia Nidus-avis Rich. II. Camp Hill, near Amberley, 1899; A. J. C. & C. E. S.

Cephalanthera ensifolia Rich. *III. Sparingly in a wood in Stanmer Park! 1891; brought to T. H. *IV. Wood on the Downs near Lewes! 1879; J. H. A. Jenner.

C. pallens Rich. IV. Firle; E. E.

Orchis pyramidalis L. II. Between Amberley Mount and Camp Hill, 1899; A. J. C. & C. E. S.

Aceras anthropophora R. Br. IV. Near Chailey! 1863; J. Edwards.

Ophrys aranifera Huds. *IV. Downs, Baldsdean! and Telscombe! 1900; T. H.

Herminium Monorchis R. Br. III. Edburton Downs; T. H.

Habenaria conopsea Benth. II. Between Amberley Mount and Camp Hill, 1899; A. J. C. & C. E. S.

H. chloroleuca Ridley. III. Roadsides in Thakeham Parish; A. J. C.

Iris fœtidissima L. *IV. Plumpton and Berwick; E. E.

Narcissus Pseudo-narcissus L. *III. Meadow near Billingshurst, and orchard and copses at Shipley; A. J. C. VII. Between Three Bridges and Tinsley Green, plentiful, 1889. In meadow near Copthorne Common and about Grange Road, 1895.

†*N. biflorus* Curtis. VII. Ifield; E. E.

Allium ursinum L. V. Common in many places about Battle, Catsfield, and Crowhurst; E. S. S. Streams about Ashburnham Park, 1895. VII. Plentiful near Three Bridges, 1895.

A. vineale L. *IV. Plumpton and near Berwick; E. E.

Juncus squarrosus L. *VI. Near Cross in Hand; E. E.

Luzula Forsteri DC. *IV. Roadsides between Hayward's Heath and Scaynes Hill, 1900; T. H. & C. E. S. VII. Wood near Bewbush Mill-pond, 1898.

L. maxima DC. V. Stream between Lower Beech Farm and the Workhouse, Battle, 1895; E. S. S.

Sparganium neglectum Beeby. V. Great Park Farm, Battle, 1895; E. S. S. Berwick, E. E. Boggy hole between Warbleton Church and Horeham Road, 1892.

S. simplex Huds. II. Amberley Wild Brooks, and ditches by the Arun, Pulborough, 1899; A. J. C. & C. E. S. V. Pond, Catsfield Green, 1895; E. S. S.

Lemna trisulca L. V. Berwick; E. E.

L. gibba L. *II. Ditch near the Arun, Arundel, 1899; A. J. C. & C. E. S. IV. Berwick; E. E.

L. polyrrhiza L. *IV. Berwick; E. E.

Alisma ranunculoides L. IV. Plumpton; E. E. Lewes Levels, 1900.

Damasonium stellatum Pers. III. Pits on St. John's Common (Borrer); Botanist's Guide, Turner & Dillwyn, 1805. IV. Near Plumpton; E. E.

Potamogeton polygonifolius Pour. *IV. Chailey Common! 1894; H. H.

P. alpinus Balb. V. Berwick; E. E.

P. lucens L. *IV. Ditches towards Iford! H. H.

P. perfoliatus L. *II. River Arun at Pulborough, 1899; A. J. C. & C. E. S. IV. Glynde; E. E. In River Ouse, Lewes to Hamsey! 1892; H. H.

P. densus L. *IV. Berwick, and pond on Downs above Street; E. E.

P. acutifolius Link. *IV. Ditch, Iford! 1899; T. H.

P. Friesii Rupr. IV. Ditch, Iford! 1897; T. H. VI. Between Rye Harbour and Camber Castle, 1900.

P. pusillus L. *II. Amberley Wild Brooks, 1899.

**P. rutilus* Wolfg. VI. Rye! 1898; T. H. See Journ. Bot. 1900, p. 65.

**P. interruptus* Kit. *IV. Near Iford! 1893; H. H. *V. Ditch, Littlington! 1900; T. H. New record for East Sussex.

Zannichellia pedunculata Reichb. *II. Ditch near Arun, Arundel, 1899; A. J. C. & C. E. S.

Zostera nana Roth. I. Bosham Channel! T. H.

Eleocharis multicaulis Sm. IV. Chailey Bog; E. E.

Scirpus fluitans L. IV. Near Plumpton; E. E. VII. Tilgate Forest! 1844; Herb. R. Pryor.

S. setaceus L. VII. Furnace Wood, Felbridge, 1895.

S. Tabernæmontani Gmel. V. Near West Dean; E. E.

S. sylvaticus L. *II. Rusper; E. E. V. Very common about Battle, Catsfield, and Crowhurst, 1895; E. S. S. Great Tanner's Farm, near Horeham Road, 1892. VII. Cut and Lie Wood, Felbridge, 1896.

S. Caricis Retz. *IV. Kingston, by Lewes, 1900; E. E. & C. E. S.

Eriophorum vaginatum L. I. Heyshot Common, near Midhurst! 1886; Rev. J. W. Parrington.

*†*Cladium jamaicense* Crantz. I. In the lake in Arundel Park! 1875; Rev. J. Fraser. In Hemsley's "Outline" this record is given with the note, "Probably an error." Mr. T. Hilton has sent me specimens from this locality, but Mr. A. Bennett tells me that it is known to have been introduced here.

Carex dioica L. II. Amberley Wild Brooks (Borrer); Botanist's Guide, Turner & Dillwyn, 1805.

C. pulicaris L. IV. Berwick Common; E. E.

C. disticha Huds. II. By the Arun, above Pulborough, 1899. *IV. Berwick Common; E. E. Between Lewes and Kingston, 1900.

C. axillaris Good. I. Lane near Birdham! 1897; T. H. *VI. Mayfield; E. E. VII. By Bewbush Mill-pond, 1898.

C. curta Good. VI. Mayfield; E. E.

C. acuta L. II. By the Arun, above Pulborough, 1899. VII. Ifield Pond, 1891.

C. montana L. *IV. In two places on Chailey Common! 1896; T. H.

C. pallescens L. V. Great Park Farm, Battle, 1895; E. S. S. Burnthouse Wood, between Battle and Netherfield, 1895. VII.

Cow Wood, Handcross, 1898; A. J. C. & C. E. S. Cut and Lie Wood, Felbridge, 1896; near Colman's Hatch, 1896; between Faygate and Bewbush, 1898.

C. pendula Huds. V. Abundant about Battle and Catsfield 1895; E. S. S.

C. strigosa Huds. V. Plentiful in a wood adjoining "The Stumblets," Great Park Farm, Battle, 1895; E. S. S.

C. lævigata Sm. II. Horsham; E. E. *IV. Near Alciston; E. E. V. Abbot's Wood; E. E. Petley Wood and Great Park Farm, Battle, 1894. VII. Cow Wood, Handcross, 1898; A. J. C. & C. E. S. Wood near Sainthill, East Grinstead, 1892; Cut and Lie Wood, Felbridge, 1896.

C. extensa Good. I. Bosham; F. H. Arnold in litt. to W. B. H., 1875. VI. Pett; E. N. B. in litt. to W. B. H., 1877.

C. pseudo-cyperus L. V. Near Catsfield, 1895; E. S. S. Boggy hole between Warbleton Church and Horeham Road, 1892. VI. Near Battle, on the road to Hastings, 1895; E. S. S. Petley Wood, 1894.

C. rostrata Stokes. II. Amberley Wild Brooks, 1899; A. J. C. & C. E. S. *V. Farthing Ponds, Battle, 1895; E. S. S.

C. vesicaria L. *II. Amberley Wild Brooks, 1899; A. J. C. & C. E. S. III. Shipley; E. E. VI. Mayfield; E. E. VII. Cut and Lie Wood, Felbridge, 1896; near Bewbush Mill-pond, 1898.

*†*Panicum Crus-galli* L. III. Barcombe and near Brighton; E. E.

†*Setaria viridis* Beauv. *III. Cultivated land, Patcham! 1893; T. H.

*†*S. glauca* Beauv. IV. Lewes; E. E.

Alopecurus bulbosus Gouan. V. By the River Cuckmere near West Dean! 1899; T. H. & E. E.

Phleum arenarium L. *I. Climping Sands; E. E.

Calamagrostis epigeios Roth. V. Berwick Common and Shipley; E. E.

[*Agrostis setacea* Curtis. V. The Heathfield Station locality, in Arnold's *Sussex Flora*, has not been verified by Mr. Roper.]

Gastridium australe Beauv. III. Common about Shipley; E. E. VI. Mayfield; E. E. VII. Crawley; E. E.

Ammophila arundinacea Host. *I. Climping Sands; E. E.

†*Avena strigosa* Schreb. *IV. Berwick; E. E.

Poa compressa L. *I. Petworth; E. E. III. Shipley; E. E. *IV. Plumpton; E. E. *VII. Ifield; E. E.

Glyceria plicata Fr. var. **declinata* (Breb.). IV. Lane End Common! 1900; T. H.

Festuca sciuroides Roth. III. Shipley; E. E. *IV. Berwick; E. E. VII. Worth Churchyard and near Three Bridges (Ellman); E. N. B. in litt. to W. B. H., 1882.

F. elatior L. × *Lolium perenne*. *III. Marsh by "Sussex Pad," Lancing! 1900; T. H.

Bromus secalinus L. III. Shipley; E. E. *IV. & V. Berwick; E. E.—Var. **velutinus* (Schrad.). III. Corn-field, Piecombe! 1897, and near Stanmer! 1899; T. H.

B. commutatus Schrad. IV. Berwick; E. E.

B. mollis L. var. **glabratus* Doell. V. Near Tut Barn; R.

†*B. arvensis* L. *IV. Near Seaford, 1879 (Ellman); E. N. B. in litt. to W. B. H., 1882.

Lolium perenne L. var. **multiflorum* (Lam.). III. Kingston-by-Sea; E. E.

L. temulentum L. var. *arvense* (With.). III. Ditchling; E. E.

Agropyron caninum Beauv. III. Keymer! 1862; ex herb. W. B. H.

A. pungens R. & S.
A. acutum R. & S.
A. junceum Beauv.
I. On the west side of the river near Littlehampton; J. L. Warren in litt. to W. B. H., 1874.

Hymenophyllum tunbridgense Sm. VII. Withyham (Borrer); Botanist's Guide, Turner & Dillwyn, 1805. Rocks at West Hoathly, 1890.

Asplenium Trichomanes L. III. Shoreham.

A. Adiantum-nigrum L. II. Pulborough and Amberley, 1899; A. J. C. & C. E. S.

Ceterach officinarum Willd. *V. Eastbourne; R. VI. Mayfield; E. E.

Lastræa æmula Brackenbridge. VI. Mayfield; E. E.

Ophioglossum vulgatum L. II. Near Faygate, 1892. V. Several meadows, Great Park Farm, Battle, 1895; E. S. S. VII. Near Ifield Mill-pond, 1898.

Equisetum maximum Lam. *IV. Near Alciston; E. E.

E. sylvaticum L. VII. Tilgate Forest; E. E. Wood near Sainthill, East Grinstead, 1892.

E. palustre L. var. **polystachyum* auct. IV. Buxted Park! 1891; E. H. F.

Lycopodium inundatum L. VII. Near Forest Row, Ashdown Forest! 1892; Miss L. G. Davenport.

[*L. clavatum* L. V. Omit the record in this division in Arnold's *Sussex Flora*.]

Chara fragilis Desv. *III. West Grinstead! (Babington); Holmesdale N. H. C. herb. Pond on Patcham Downs! 1886; A. J. C. Lancing! 1896; T. H. *IV. Pond, Mount Caburn! 1895; T. H. *VII. Pond near East Grinstead towards Shovelstrode, 1895.—Var. *Hedwigii* Kuetz. *II. Amberley Wild Brooks, 1899; A. J. C. & C. E. S. *V. Great Park Farm, Battle, 1895; E. S. S. *VII. Pond near East Grinstead towards Shovelstrode, 1895. In a pond at Colman's Hatch, Ashdown Forest, a beautiful form of *C. fragilis* occurred between vars. *Hedwigii* and *capillacea*; 1896.

C. aspera Willd, Omit this species in Arnold's *Sussex Flora*.

C. vulgaris L. *IV. Pond, Mount Caburn! 1895; T. H. *VI. Ditch near Camber Castle, 1895.—Var. *longibracteata* Kuetz. *IV. Iford! 1894; T. H. *V. Near Pevensey Sluice, 1895; E. S. S. *VI. Ditch near Camber Castle, 1895.—Var. *papillata* Wallr. *IV. Between Lewes and Kingston, 1900. *V. Near Pevensey Sluice, 1894.

Tolypella prolifera Leonh. *II. Ditch, Amberley Wild Brooks! 1900; T. H. A most interesting record; Borrer found this plant near Henfield, in 1827—its first discovery in Britain—but I cannot find that botanists have seen it in the county in recent years.

Nitella flexilis Agardh. IV. Chailey Common! 1900; T. H. *V. Pond at Catsfield, 1895; E. S. S.

SOME KIRKCUDBRIGHT MOSSES.

By W. P. Hamilton.

The following is a list of mosses gathered during a fortnight's stay at Kippford in June, 1900, many of them within a radius of about a couple of miles of that place, but some from Hestan Island and Screel.

Although the village is all under the name of Kippford for postal purposes, it is generally spoken of by the fishermen and others as The Scar, or The Scaur; that name, however, being strictly applicable to only the southern end. Pleasantly situated on the east side of the estuary of the River Urr, about five miles south of Dalbeattie, and, fortunately for people of some tastes, possessing a not very extensive accommodation for visitors, it is an interesting place for the botanist. On the other side of some small hills to the north-east and east there lies a string of lochs known locally as Duff's Loch, Ironhash, and Lochend, well worth attention. This tract of country is formed partly of granite and partly of Upper Silurian strata. The granite near Kippford is a part of the great plutonic mass which extends continuously from Criffel to Dalbeattie and onwards to Bengairn, one of the prominent hills to the south-west in the direction of the town of Kirkcudbright. The boundary line is visible on the east side of the estuary of the Urr, about a mile south of Kippford, and it can be followed in an E.N.E. direction by the village of Lochend to Sandhill's Bay. The granite lies to the north and the Silurian strata to the south of this line. The latter consists of flagstones, shales, and greywackes, altered by contact with the granite, and pierced by numerous veins of micro-granite, porphyrite, and other igneous materials representing the apophysis of that mass.

Hestan Island, the "Ben Rathan" of Crockett's *Raiders*, lies in the Solway Firth, distant three miles in a bee-line, or about four miles' sail; it is composed of Upper Silurian, like that above described. The hill of Screel lies to the north of the granite mass of Bengairn, and is composed also of Upper Silurian strata. It forms a striking landmark as seen from the village, and, although under 1200 ft. in height, yet, on account of its rising from so near the sea-level, it affords a very stiff climb.

I am indebted to the kindness of Mr. John Horne for the geological notes; to Mr. J. E. Bagnall and Mr. J. A. Wheldon for looking at some of the mosses; and to Mr. E. C. Horrell for naming or confirming the Sphagna.

Sphagnum acutifolium Russ. & Warnst. var. *flavo-rubellum* Warnst. (*S. acutifolium* Ehrh. *ex parte*). Mark Hill.—Var. *versicolor* Warnst. Mark Hill.—*S. subnitens* Russ. & Warnst. (*S. acutifolium* Ehrh. *ex parte*), var. *flavescens* Warnst. Mark Hill. — Var. *flavo-rubellum* Warnst. Mark Hill and Screel.—Var. *virescens* Warnst. and forma *squarrosula*. Mark Hill. — *S. inundatum* Warnst. (*S. subsecundum* varr. *contortum* & *obesum* Auct. *ex parte*). Duff's Loch and Mark Hill.—*S. cymbifolium* Warnst. (*S. cymbifolium* Ehrh. *ex parte*) var. *glauco-pallens* Warnst. Mark Hill. — *S. papillosum* Lindb. var. *normale* Warnst. Duff's Loch and Mark Hill.—Var. *sublæve* Limpr. Screel.

Andreæa Rothii W. & M. Screel.

Catharinea undulata W. & M. Screel.

Polytrichum nanum Neck. Rockcliff.—*P. aloides* Hedw. Dense bright green patches on small bare places on hill-sides; barren and probably young plants.—*P. piliferum* Schreb. Common.—*P. juniperinum* Willd. Frequent.—*P. commune* L. Screel, &c.

Ceratodon purpureus Brid.—*C. conicus* Lindb. Hestan Island.

Dicranella heteromalla Schimp.

Blindia acuta B. & S. Screel.

Dicranoweissia cirrata Lindb. In both dull and bright green forms.

Campylopus atrovirens De Not. Screel.

Dicranum Bonjeani De Not. Resembling *D. majus* in habit. Leaves secund, but strongly undulate. Duff's Loch. Another form has leaves normal in direction, bluntly serrate, and cuspidate tips to the branches. Kippford.—*D. scoparium* Hedw. Common. Light yellowish interrupted form with straight glossy leaves. Meikle Hill. A similar plant, deep green. Hestan Island. Leaves in successive distant comal tufts on an apparently elongated stem due to innovation. Stream-side near Screel.

Leucobryum glaucum Schimp.

Fissidens bryoides Hedw. Hestan Island.—*F. osmundioides* Hedw. Duff's Loch, Rough Island, and Screel.—*F. adiantoides* Hedw.

Grimmia apocarpa Hedw.—*G. maritima* Turn.—*G. pulvinata* Sm.—*G. trichophylla* Grev.

Rhacomitrium aciculare Brid. — *R. protensum* Braun. Screel.—*R. heterostichum* Brid. var. *gracilescens* B. & S. Screel.—*R. lanuginosum* Brid. Mark Hill and Screel.

Ptychomitrium polyphyllum Fürnr. Screel.

Hedwigia ciliata Ehrh. Abundant on rocks and walls.

Tortula muralis Hedw. var. *rupestris* Wils. Lochend.

Barbula revoluta Brid. Duff's Loch.—*B. convoluta* Hedw. Rockcliffe.—*B. unguiculata* Hedw.

Weissia viridula Hedw.—*W. verticillata* Brid. Hestan Island.

Trichostomum mutabile Bruch. Hestan Island and Rough Island.

Ulota Bruchii Hornsch. Glen Island.

Orthotrichum affine Schrad. Glen Island.

Funaria ericetorum Dixon. Hill-side, Kippford. — *F. hygrometrica* Sibth.

Aulacomnium palustre Schw.

Philonotis fontana Brid. A remarkable form occurred in a cavity over a well, exceedingly slender, the stems long drawn out, and with all the appearance of a pleurocarpous moss. It was mixed with *E. Swartzii*.

Breutelia arcuata Schimp. Screel.

Bryum inclinatum Bland. Kippford.—*B. pseudotriquetrum* Schw. Male plants. Kippford.—*B. cæspiticium* L.—*B. capillare* L. and var. *macrocarpum* Hübn. — *B. alpinum* Huds. Abundant in conspicuous handsome tufts from just above sea-level.—*B. argenteum* L.

Mnium rostratum Schrad.—*M. undulatum* L.—*M. hornum* L.—*M. punctatum* L.

Porotrichum alopecurum Mitt. Stream near Screel.

Heterocladium heteropterum B. & S. Screel.

Thuidium tamariscinum B. & S.

Isothecium myurum Brid. Screel.

Pleuropus sericeus Dixon. Hestan Island.

Brachythecium rutabulum B. & S.—*B. populeum* B. & S. Kippford. —*B. purum* Dixon.

Eurhynchium prælongum B. & S. var. *Stokesii* Brid. Lochend.—*E. Swartzii* Curnow. An extremely delicate form occurred in the mouth of an old copper-mine on Hestan Island. — *E. tenellum* Milde. Hestan Island.—*E. myosuroides* Schimp. Glen Island and Lochend.—*E. rusciforme* Milde.

Plagiothecium denticulatum B. & S.

Hypnum stellatum Schreb.—*H. fluitans* L. Near var. *falcatum* Schimp.; reddish in colour. Screel, on the ground.—Var. *Holtii*,* or a form very near to it. Screel, in deep water.—*H. exannulatum* Gümb. var. *brachydictyon* Ren. Duff's Loch.—*H. uncinatum* Hedw. Lochend.—*H. revolvens* Swartz. Rockcliffe.—*H. cupressiforme* L. var. *filiforme*. — *H. scorpioides* L. Mark Hill. — *H. sarmentosum* Wahl. Screel. — *H. cuspidatum* L. A slender form near var. *pungens* Schimp. Lochend.—*H. Schreberi* Willd.

Hylocomium splendens B. & S.—*H. loreum* B. & S.—*H. squarrosum* B. & S.—*H. triquetrum* B. & S.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1900.

By George Murray, F.R.S.

Of the additions to the collection by purchase, the most notable acquisitions were the herbarium of exotic Mosses and of Hepatics of M. Emil Bescherelle, of Paris, containing nearly 16,000 specimens. Its chief value consists in the types of many new species described by M. Bescherelle, and in the large number of specimens collected in the French Colonies, and hitherto poorly represented in the Museum. It also contains collections made in the islands of Amsterdam and St. Paul, Brazil, Paraguay, Tahiti, Japan, Mexico, and the Marquise Islands, which were described by M. Bescherelle, and many authentic specimens from older French botanists and explorers.

---

* Since the above was written the form has been named by Mons. Renauld var. *anglicum* forma *Holtii*.

There were also acquired a complete set of Ellis and Everhart's valuable North American Fungi, consisting of 3600 specimens.

A notable event has been the completion of the great series of drawings of British Basidiomycetes by Mr. Worthington G. Smith, now exhibited in the Public Gallery.

The additions to the collections by presentation have consisted of:—513 plants from India and Malaya, from Sir George King; 670 specimens, including 47 ferns from Guatemala, from Capt. John Donnell Smith; 125 phanerogams and 24 cryptogams from Klondike, from J. B. Tyrrell, Esq.; 139 specimens, including 4 cryptogams from Canary Islands, collected by the Rev. R. P. Murray, from Government Grant Committee; 3 specimens from Rhodesia, from R. Doley, Esq.; 60 specimens of flowering plants and 1 fern from Transcaucasia, from W. Rickmers, Esq.; 134 specimens from the Chinese Provinces Shansi, Shensi, and Honan, from W. H. Shockley, Esq.; 22 specimens from various countries, from Dr. A. B. Rendle; 15 specimens from various countries, from Arthur Bennett, Esq.; 179 specimens from Australia, from J. H. Maiden, Esq.; 2 specimens of orchids, from Mons. Barbey; 210 specimens, including 1 fern from East Tropical Africa, from Dr. Donaldson Smith; 63 specimens from France, from Mons. E. Malinvaud; 4 fruits, 5 ferns, and 7 algæ from India, from Dr. David Prain; 102 marine phanerogams and algæ from India, from Edgar Thurston, Esq.; 5 specimens from British Guiana, from G. Jenman, Esq.; 5 specimens of cultivated orchids, from Messrs. Hugh Low & Co.; 4 specimens of cultivated orchids and 1 fern, from J. T. Bennett Pöe, Esq.; 30 specimens of cultivated orchids, from Sir Trevor Lawrence; 3 specimens from Portugal, from the Rev. E. Armitage; 2 specimens, from J. Sparkes, Esq.; 9 specimens of cultivated orchids, &c., from Messrs. Veitch & Sons; 3 specimens of cultivated orchids, from Messrs. Sander; 3 specimens of cultivated orchids, from Sir F. Wigan; 3 specimens of cultivated orchids, from F. V. Moore, Esq.; 291 archegoniate plants from India, from J. F. Duthie, Esq.; 2 cryptogams from Minorca, from Mr. Oldfield Thomas; some specimens of *Isaria* on pupæ of Cicada from Mexico, from Lt.-Col. F. G. L. Mainwaring; some specimens of *Halimeda* from Funafuti, from Dr. Edgeworth David; 3 West Indian *Characeæ*, from Messrs. H. & J. Groves; 9 micro-fungi, from E. S. Salmon, Esq.; part of a type-specimen of *Turbinaria*, from Major Reinbold; 85 ferns of Jamaica, from William Fawcett, Esq.; and single specimens by J. Cosmo Melvill, Esq.; Mrs. E. A. Barclay; Prof. Schinz; Dr. A. Zahlbruckner; Geo. Gibson, Esq.; Prof. Bureau; Mons. Barratte; Mrs. A. G. Stennett; C. B. Clarke, Esq.; Prof. Trelease; H. T. Pitt, Esq.; Dr. W. Hume; A. H. Smee, Esq.; Dr. T. Cooke; Capt. Stanley Flower; F. C. Kitto, Esq.; Prof. Borbás; A. B. Percival, Esq.; and W. Warpur, Esq.

The following additions have been made by presentation to the British Herbarium:—203 specimens from Rev. E. S. Marshall;

4 specimens from E. Potts, Esq.; 12 specimens from G. C. Druce, Esq.; 15 specimens, including 1 *Chara*, from C. E. Salmon, Esq.; 3 specimens from Arthur Bennett, Esq.; 3 specimens and 1 rubbing from Wm. Whitwell, Esq.; 163 hepatics from West Scotland, by Symers M. Macvicar, Esq.; 10 micro-fungi from Ayrshire, by D. A. Boyd, Esq.; a new British moss, with descriptive pamphlet, by W. E. Nicholson, Esq.; specimens of fungi, with descriptive pamphlets, by Charles Crossland, Esq.; 2 photographs of diseased plum-fruits, by the Rev. E. N. Bloomfield; 8 hepatics from Norfolk, by H. N. Dixon, Esq.; specimens of diseased cherry-trees, by A. O. Walker, Esq.; and single specimens by James Groves, Esq.; Rev. J. Harry Bloom; A. Craig Christie, Esq.; Rev. E. Gepp; M. Teesdale, Esq.; Prof. D. Oliver; N. Colgan, Esq.; Rev. H. P. Reader; C. P. Andrews, Esq.; and Malcolm Bell, Esq.

The following additions have been made by exchange of duplicates:—138 specimens from South Africa, from J. Medley Wood, Esq.; 27 specimens of *Najas* from Russia and Central Asia, from the Botanical Museum, St. Petersburg; 916 specimens, including 130 cryptogams, from the Royal Botanical Museum, Berlin; 42 specimens of American *Umbelliferæ*, from Prof. Coville; 114 specimens, including 9 ferns, chiefly South African, from Prof. Hans Schinz; 372 specimens, including 5 ferns, from North Africa, Transylvania, and Mexico, from Mons. G. Barratte; 200 cryptogams, from the K.K. Naturhist. Hofmuseum, Vienna; 67 marine algæ, from Dr. Perceval Wright; a portion of Wilson's British moss-herbarium, containing 437 additional specimens, from Warrington Museum.

The following specimens have been acquired by purchase:—1011 specimens, including 85 ferns, from Porto Rico, 268 from S. Domingo, and 703 from Tibet, by various collectors, from J. F. Hamilton; 160 specimens of Carices, &c., by Kneucker; 148 specimens from Syria, by Dr. Post; 254 phanerogams and 6 cryptogams from Mexico, by C. G. Pringle; 100 phanerogams from Poland, by Dr. Woloszczak; 648 phanerogams and 87 cryptogams from China, by Father Hugh; 794 phanerogams and 37 cryptogams, from Baram District, Borneo, by C. Hose; 451 phanerogams and 22 ferns from Natal, by F. Wilms; 134 phanerogams (Herb. Dendrologicum), by E. Koehne; 600 phanerogams and 125 cryptogams from Colorado, by C. F. Baker; 505 phanerogams and 14 ferns from Costa Rica, by Adolfo Tonduz; 100 European plants (Herb. Normale), by Schultz; 200 Fungi (Mycotheca Italica), by D. Saccardo; 50 mosses from the Malay Archipelago, by Max Fleischer; 150 North American algæ, by Collins, Holden, and Setchell; the fern-herbarium of the late Sir Rawson W. Rawson, containing 2000 specimens; 238 European Sphagna, by Warnstorf; 100 American algæ, by Tilden; 100 Bohemian mosses, by Bauer; 50 parasitic fungi, by Briosi and Cavara; 50 micro-fungi, by Vestergren; 100 micro-fungi, by Sydow; 100 Russian fungi, by Jaczewski, Komarov, and Tranzschel; 143 South American hepatics, by Dusén; 50 micro-fungi, by Rehm; 50 Japanese algæ, by Okamura; 50 economic fungi from North America, by Seymour and Earle; 2 water-colour drawings and

41 diagrams, by R. Morgan; 20 photographs of trees and 16 of tree-stems, by Henry Irving; 7 botanical diagrams, by Miss M. O. Mitchell; 17 water-colour drawings of cryptogams and other plants, by Highley; 4 sheets of water-colour drawings of fungi, by W. G. Smith.

The following additions have been made by purchase to the British Herbarium:—40 North English lichens, by Johnson; 54 lichen-types, by Crombie; 60 *Characeæ*, by Groves; 314 slides of fresh-water algæ, by West; 250 Irish hepatics, by McArdle; 25 algæ, by Holmes.

SHORT NOTES.

New Variety of Fontinalis antipyretica L. — During the drought of the summer of 1900, when the little river Ouse about a mile and a half above Lewes was running very low, I noticed several long floating masses of a *Fontinalis* growing on the hard chalk forming the bed of the river, which has been diverted into an artificial channel at this point. The short rather distant concave leaves suggested a robust form of *F. squamosa*, but the slightly triquetrous points of the growing shoots and general habit indicated it as a form of *F. antipyretica* L. I was, however, unable to identify it with any of the described varieties. On my referring the matter to Mr. H. N. Dixon, he told me that he had found the same form growing in a canal near Northampton; and M. J. Cardot, to whom I also referred it, said that he had in his herbarium an identical form from the Thames. The latter also kindly referred me to his *Monographie des Fontinalacées*, p. 52, where he speaks of the Thames plant as "a specimen of the forma *diffusa*"; but he adds in his letter that a distinct variety might be made of the present plant, "characterized by the soft, shortly oval scarcely carinate leaves with shorter cells"; and I gather from his letter that by these characters the present plant may be distinguished not only from the type, but from the ordinary forms of M. Cardot's forma *diffusa* and the var. *laxa* Milde, to which he is inclined to refer his forma *diffusa*. The description of the var. *laxa* Milde given by Limpricht (*Die Laubmoose*, p. 655) must relate to a very different form from the present plant, as he speaks of it as a smaller, more slender form with widely decurrent leaves, which are orange along the base, and have numerous auricular cells—features which are by no means characteristic of the present plant.

Fontinalis antipyretica L. var. nov. cymbifolia. Robust with long floating stems, blackish below, hardly shining, with the triquetrous arrangement of the leaves of the type very indistinct, and only visible in the tips of the growing shoots. Leaves *soft*, rather distant, *shorter* than in the type, oval, concave, *not or very faintly carinate*, usually distinctly serrate at the obtuse points, with no distinguishable auricles, margins erect; cells *wider* (to 0·025 mm.) and much *shorter* than in the type, only three to four times as long as broad in the upper part of the leaf, where they are rhomboidal in shape, rather more elongate below, but never so long as in the type. Fruit unknown.

Hab. Thames near Kew, *F. J. Brocas*, Herb. Cardot. Canal near Northampton, and Ouse at Hemingford Grey, Huntingdonshire, *H. N. Dixon*. Ouse near Lewes, Sussex, *W. E. Nicholson*.—W. E. Nicholson.

Moenchia quaternella Ehrh. — In Mr. Williams's interesting account of the above plant (p. 365), he mentions that it has not been recorded from Huntingdon. In the Cardiff Museum Herbarium there are specimens from Miss Payne, gathered "near St. Ives, Hunts. 6. 87." In addition to the vice-counties given in Top. Bot. ed. 2, may be named—4. Devon north, Record Club Report, 1881–2; and 8. Wilts north, W. A. Clarke in litt. It seems a plant not often gathered, perhaps from its early flowering and quick decay.—Arthur Bennett.

Lobelia urens on Dartmoor. — You may be interested to hear that, growing abundantly in a locality on Dartmoor, I have found *Lobelia urens*. It occurred in three spots, a few hundred yards apart, on a barren limestone soil, surrounded by bracken, whortleberry, etc. The locality has not been cultivated at all for many years, and the greater part of it has probably never been so. The plants are in remarkably thriving condition; in one part they grow so thickly that they might conveniently be cut with a scythe, and the ground is as blue with them as it might be with hyacinths.—W. K. Martin.

Orobanche amethystea Thuill.—In the spring of this year we introduced into the hospital garden at Walton Prison some roots of the Canterbury-bell (*Campanula medium*) from Lowestoft. Subsequently about a dozen specimens of *Orobanche amethystea* Thuill. appeared, parasitical on their roots. Mr. Arthur Bennett kindly determined a fresh specimen, and remarked: "I have no record of it on *Campanula*, but it occurs on *Plantago Coronopus*, *Daucus Carota*, *Ononis arvensis*, and *Eryngium maritimum*." I carefully traced its attachment to the *Campanula* roots, and have a dried specimen *in situ*.—J. A. Wheldon.

Glyceria Borreri Bab. at Shoreham.—I recently found a specimen of this grass in the herbarium of Miss E. Foulkes Jones, now of Chester, with the interesting label, "Coast near the Norfolk bridge, Shoreham. Coll. *J. Leicester Warren*, June-July, 1871:—*25 of these*." The late Rev. F. H. Arnold, in his *Flora of Sussex*, though it was not published till 1887, gives only the record (probably for the same locality), "By the seaside between Shoreham and Worthing, 1848, *Herb. late H. Collins*." Whether Mr. Warren (Lord de Tabley) reported his collection of the species anywhere, I do not know.—William Whitwell.

The late William Mathews.—To his contributions to botanical literature, named on p. 352, should certainly be added the excellent little *Flora of the Clent and Lickey Hills*, 1881, and his very valuable "History of the County Botany of Worcester," which ran through the pages of the *Midland Naturalist* from April, 1887, to July, 1893.

This last-named work is not only most interesting in itself, but must prove of the utmost value to the future writer of the Flora of the county—a task which at one time it was hoped Mr. Mathews would himself have undertaken, and for which his intimate knowledge of the county and its plants so eminently fitted him, until his long illness showed such a work to be impossible. No notice of Mr. Mathews would be complete without some mention of the willing and valuable help that he accorded to those less informed than himself. For such help, as well as for many kindnesses, I was often indebted to him, and notably for the assistance he gave in furnishing careful translations from continental writers when such were likely to be useful.—R. F. Towndrow.

[Mrs. Mathews informs us that her late husband's botanical and geological interests began in his boyhood. His botanical collections were sent to Kew shortly before his death, the Worcestershire plants being transferred thence to Worcester. Mathews's geological collections were presented in 1899 to Mason College, Birmingham; the statement that he sent plants to Queen's College is erroneous.—Ed. Journ. Bot.]

NOTICE OF BOOK.

Prodromus Floræ Britannicæ. Part 2. By F. N. Williams. Price 2s. 2d. post free, from the author, 181, High Street, Brentford. Nov. 1901.

British botanists will welcome the second part of this new flora, which is just ready; they will rejoice to find that Mr. Williams is proceeding apace with his useful and important work. It contains 79 species of *Compositæ* belonging to 29 genera, and occupies 58 large octavo pages. While following the plan exhibited in the first (or specimen) part, there is here a fuller amount of detail, and, where necessary, more attention has been paid to the synonymy of the species; thus the average space devoted to each plant is considerably more, and on the scale of the two parts, taken together, the descriptions, &c., of all the British flowerng plants seem likely to require about 1260 pages, of which 74 pages, or about one-seventeenth of the whole, are now done.

On the inner pages of the wrapper Mr. Williams refers to and discusses the difficulty or inexpediency of separating in local floras native plants from those long naturalized. "In British floras generally, only those species are considered naturalized whose date of appearance in these islands can be approximately fixed. On the other hand, those who especially devote their attention to aliens, colonists, and denizens, would go so far as to exclude not only the species commonly met with on cultivated ground, but also those usually found on the borders of fields and by road-sides, and would even remove from the category of natives such a common species as *Lamium album.* In the present contribution to British botany, the plants whose names are italicized in the last edition of the *London Catalogue* are to a great extent not included."

In addition to the species admitted into the flora, great care has been taken in the treatment of varieties, and of the more conspicuous forms; critical botanists will value these details, which show deep research and some originality. *Compositæ* is a family which offers a good deal of difficulty in the due limitation of its numerous genera, and the thistles form an instance of such difficulty; our author, however, is probably right in following the best authorities, and in separating generically the species which possess pappus with plumose setæ from those with scabrid setæ; the former set, with eight British species, being referred to *Cirsium*, and the latter, with four species, to *Carduus*. Of course, the Carline thistle and the cotton thistle are, as usual, referred to *Carlina* and *Onopordum* respectively.

The meadow thistle, familiar to English botanists under the name of *Carduus pratensis* Huds., is given on page 49 as "**Cirsium britannicum** *Scop.* Iter Gorizense, in Ann. ii. Hist. Nat. p. 60 (1769)": there is, however, sufficient reason to question the correctness of this name for the species. Scopoli in his book, *Annus II. Historico-Naturalis*, pp. 60, 61, Iter Tyrolense (1769), established *Cirsium Britannicum;* he described the plant (and a variety), and stated that it was the *Cirsium Britannicum Clusii repens* I. of Bauhin, the *Cirsium* II. of Clusius, and the *Cirsium singulari capitulo squamato* of C. Bauhin. Both the description and all the references point rather to *Cirsium heterophyllum* Hill than to *Carduus pratensis* Huds.; the variety is the form with more than one flower-head on the stem. He also quoted a plant, with characteristic figure, of Haller (Enum. Meth. Stirp. Helvet. p. 683, tab. xxi.), which belongs to *Cirsium heterophyllum* Hill; he further added that without doubt his plant was the *Carduus foliis lanceolatis dentatis amplexicaulibus spinulis inæqualibus ciliatis caule inermi* of Linnæus. The Linnean plant is *Carduus helenioides* L. Sp. Pl. ed. i. p. 825, n. 20, which is now considered synonymous with *Cirsium heterophyllum* Hill, and is not *Carduus pratensis* Huds. It seems therefore that *Cirsium britannicum* Scop. is a synonym of *C. heterophyllum* Hill.

It is not certain whether *Cirsium canum* All. (1785) is the same species as *Carduus pratensis* Huds., but it would be safe to use *Cirsium anglicum* Cand. Fl. France, iv. p. 118 (1805) for the meadow thistle. There is no adequate reason to deny that *Carduus dissectus* L. Sp. Pl. ed. i. p. 822, n. 8, is the same species as *C. pratensis* Huds., although from the time of Lightfoot (1777) to the present day the identity has been disputed; no type-specimen seems to exist, but all the references given by Linnæus agree.

Mr. Williams is, no doubt, correct (page 60) in his use of the name *Cirsium acaule* Scop., but the earliest reference should be to Scopoli's *Annus II. Hist.-Nat.* above cited, p. 62.

Excellent examples of careful detail are afforded in the account of *Crepis virens* L., with its varieties and forms, and in the treatment of *Centaurea Jacea*, in which the author arrives at conclusions different from those hitherto usually accepted by British botanists. The appreciation of such wealth of information will induce botanists to look forward with pleasant anticipation to the continuation of the work.

W. P. Hiern.

ARTICLES IN JOURNALS.[*]

Annals of Botany (Sept.). — M. C. Ferguson, 'Development of Egg and Fertilization in *Pinus Strobus*' (8 pl.). — A. H. Church, 'Note on Phyllotaxis.' — E. Dale, 'Origin, Development, and morphological nature of tubers in *Dioscorea sativa*' (1 pl.).—W. H. Lang, 'Apospory in *Anthoceros*' (1 pl.). — M. Dawson, 'Economic importance of 'Nitrogin.'' — L. Lewton Brain, '*Cordyceps ophioglossoides*' (1 pl.).—F. F. Blackman & G. L. C. Matthaei, 'Reaction of leaves to traumatic stimulation' (1 pl.).—W. T. Thiselton-Dyer, 'Morphological Notes.'

Botanical Gazette (24 Sept. & 21 Oct.).—F. L. Stevens, 'Gametogenesis and fertilization in *Albugo*' (concl.). — W. L. Bray, 'Vegetation of Western Texas' (concl.). — (Sept.). F. M. Lyon, 'Sporangia and gametophytes of *Selaginella*' (concl.). — (Oct.) J. B. Dandeno, 'Application of normal solutions to biological problems.' — B. E. Livingston, 'Physiology of polymorphism in Green Algæ.'—J. Schneck, '*Aquilegia canadensis* & *A. vulgaris*.'

Botanical Magazine (Tokyo) (20 Aug. & 20 Sept.). T. Makino, 'Observations on the Flora of Japan' (cont.). — (20 Aug.). J. Matsumara, 'Cerasi japonicæ duæ species novæ.' — (20 Sept.). J. Matsumara, 'New *Leguminosæ* from the Island of Yezo' (*Astragalus* & *Oxytropis*).

Bot. Notiser (häft 5; 1 Nov.). — S. Murbeck, '*Ranunculus auricomus* × *sulphureus*, nov. hybr.' (1 pl.). — T. Hedlund, 'Om fjällens byggnad och deras förhållande till klyföppningarne hos en del Bromeliaceen.'—A. Nilsson, 'Om sträfvenefter enhot i den växtgeografiska nomenklaturen.'—F. R. Aulin, '*Glyceria reptans*.'

Bot. Zeitung (15 Oct.). — W. Ruhland, 'Zur Kenntniss der intracellularen Karyogamie bei den Basidiomyceten' (1 pl.).

Bull. de l'Herb. Boissier (30 Sept. & 31 Oct.). — F. Stephani, 'Species Hepaticarum' (cont.). — G. Hegl, 'Das Obere Toesstal' (cont.). — (30 Sept.). O. & F. Fedtschenko, 'Matériaux pour la Flore du Caucase' (cont.).—H. Schinz, 'Beiträge zur Kenntnis der afrikanischen Flora' (concl.).—W. Schmidle, '*Rhodoplax* Schmidle & Wellheim,' gen. nov. (Algæ; 1 pl.).—H. Christ, 'Filices Faurianæ.' — (Oct. 31). H. de Boissieu, 'Les *Viola* de Chine.' — K. Fritsch, 'Zur Flora von Angola.' — H. Christ, *Aspidium Münchii*, sp. n.

Bull. Soc. Bot. France (xlviii, 3-4; Sept.). — V. Payot & —. Harmand, 'Lichens du Mont Blanc.'— —. Du Colombier, 'Lichens des environs d'Orléans.' — E. Heckel, 'Une variété alimentaire de *Dioscorea pentaphylla*.'—D. Bois, *Plectranthus Coppini*.—E. Boudier,

---

[*] The dates assigned to the numbers are those which appear on their covers or title-pages, but it must not always be inferred that this is the actual date of publication.

Cercosporella Narcissi & *Scopularia Clerciona*, spp. nn. (1 pl.).—L. Legré, 'Pierre Belon' (1517–64). — Antoine Constantin, 'Max Cornu' (portr.).—(xlviii, 5–6; Oct. (received 14 Nov.)).—P. Fliche, *Sorbus* hybrides dans le Jura.'—P. Husnot, *Melica caricina* d'Urv. & *Phalaris crypsoides* d'Urv.—D. Clos, 'Les genres des Graminées au xviii siècle.' — F. Gagnepain, 'Revision des genres *Mantisia* & *Globba* de l'Herbier du Muséum.' — J. P. Hoschedé, 'Notes sur quelques hybrides.'

Bull. Torrey Bot. Club (30 Sept.). — E. W. Berry, 'Origin of Stipules in *Liriodendron*' (2 pl.).—P. A. Rydberg, 'Rocky Mountain Flora.' — E. P. Bicknell, 'Further notes on the Agrimonies.'—(26 Oct.). O. F. Cook, 'Palms of Puerto Rico' (6 pl.): *Thrincoma*, *Thringis*, *Aeria*, *Acrista*, *Curima*, *Cocops*, genn. novv.—E. P. Bicknell, 'Studies in *Sisyrinchium*' (cont.).

Gardeners' Chronicle (12 Oct.).—*Cotyledon nana* N. E. Br., *Stapelia maculosoides* N. E. Br.; (26 Oct.). *Ceropegia Lugardi* N. E. Br.; (2 Nov.). *Sempervivum velutinum* N. E. Br.

Journal de Botanique ("Juillet," received 2 Oct.).—L. Guignard, 'La double fécondation dans *Naias major*.'—F. Péchoutre, 'L'ovule et la graine du *Geum urbanum*.'—P. Parmentier, 'Sur le pollen des Dialypétales.' — C. Sauvageau, 'Les Sphacélariacées.' — ("Août," received 9 Nov., & "Septembre," received Nov. 20). A. Lemaire, 'Sur le gaine de quelques Schizophycées.'—F. Guégnen, 'Anatomie du style et du stigmate des Phanérogames.'

Malpighia (xv, fasc. 2–3: received 11 Nov.). — G. Cecconi, 'Galle della Foresta di Vallombrosa.'—A. Noelli, *Aecidium Isatidis*. — C. Massalongo, 'Sopra alcune Milbogalle' (4 pl.). — O. Penzig, Antonio Piccone (1844–1901).

Oesterr. Bot. Zeitschrift (Sept. & Oct.). — F. Vierhapper, 'Zur systematischen Stellung des *Dianthus cæsius*.' — E. Häckel, 'Neue Gräser' (cont.).—J. Freyn, 'Plantæ Karoanæ' (cont.; 1 pl.).—R. Wagner, *Erythrina*. — K. Ronniger, '*Gentiana Villarsii* und deren Kreuzungen mit *G. lutea*.'

Rhodora (Sept.–Nov,).—M. A. Day, 'Herbaria of New England.'—(Sept. & Oct.). G. E. Davenport, 'Notes on New England Ferns.'—(Sept. 16). M. L. Fernald, 'New Stations for *Juncus subtilis*.'—L. R. Jones, '*Lathyrus tuberosus* in Vermont.' — (Oct. 5). A. L. Andrews, '*Habenaria lacera* × *H. psychodes*.' — M. L. Fernald, '*Scirpus supinus* and allies.'—(Nov.). W. Deane, 'Albino fruits of Vacciniums.'—B. L. Robinson, 'N. American Euphrasias.'—M. L. Fernald, *Lycopodium complanatum*.

Trans. Linn. Soc. (Bot. vi, 2; Sept.).—W. C. Worsdell, 'Comparative Anatomy of *Cycadaceæ*' (2 pl.).

BOOK-NOTES, NEWS, &c.

The handsome volume dealing with the *Fauna, Flora, and Geology of the Clyde Area*, edited by Messrs. G. F. Scott Elliot, Malcolm Laurie, and C. Barclay Murdoch, and prepared in connection with the recent visit of the British Association to Glasgow, has lately reached us. It is an extremely full catalogue, extending to nearly 600 pages, of the natural history of the district, and reflects great credit on all who have been concerned in its production. The botanical portion, which alone concerns us, begins with a brief "History of Botany in Glasgow," by Prof. Bower; this is followed by a note on the Phyto-plankton of the Clyde sea-area, and by lists of the Freshwater Algæ, by various hands, including Messrs W. & G. S. West; Marine Algæ, by Dr. Batters; Diatoms, by Mr. W. T. Comber; Lichens, by Mr. Scott Elliot; Fungi (microscopic), by Mr. D. A. Boyd; Hymenomycetes and Gasteromycetes, by Mr. William Stewart; Ferns and allies, by Mr. P. Ewing, who also undertakes the Hepaticæ and Phanerogams; Mosses, by Mr. J. Murray. The assistance of numerous works is acknowledged in the preface to each list, and the enumeration is one of the most complete ever given for a limited area. The volume, which costs only 5s. net, may be obtained from Messrs. James Maclehose Bros., 61, St. Vincent Street, Glasgow.

During October two instalments of the Kew *Bulletin* were issued—one dated "April–June," the other "July–September"; according to the Stationery Office date, both were printed in the last-named month. The latter contains descriptions of numerous new African and other plants, by members of the Kew staff, and a paper on exotic Fungi, by Mr. Massee, in which he establishes two new genera—*Glæocalyx* and *Cerion* (Ascomycetes)—and describes numerous new species. A note on Mr. Nicholson's retirement states that the Kew *Handlist of Trees and Shrubs*, issued anonymously, was prepared by him. The statement that it is "universally accepted as a standard authority for their nomenclature" is, we think, somewhat too absolute; the list is undoubtedly useful, but a very slight examination suffices to show that the synonymy requires revision.

The *Index to Vols. I.—X. of the Annals of Botany* (1887-1896), "prepared by T. G. Hill, A.R.C.S., under the direction of the Editors," has just been issued; it is bound in cloth, contains sixty-four pages, and costs six shillings. No recent publication needs indexing more than the *Annals*, for in none are the contents of the separate volumes more inadequately indicated. The entries in the new index are in almost all cases too long—*e. g.* it seems unnecessary to add the word "description" after the name of each new species when the preface distinctly states that only described species are included. The new use of the * and †—the former "indicates an illustration," the latter "a palæobotanical article"—has nothing to recommend it; and the former sign is so often employed in indexes to indicate a new species that its present use is confusing. We are glad to note that all the entries are included in one alphabet; but we regret that the index was not brought more nearly up to date. A practised index-maker would, we think, have compressed all the information given into half the space occupied.

A NEW EDITION of the *Flora of Liverpool*, under the superintendence of Dr. C. Theodore Green, F.L.S., President of the Liverpool Naturalists' Field Club, will be issued early in 1902. It will be illustrated from photographs of the scenery of the district by Dr. J. W. Ellis, and many drawings of the flowers by Miss E. M. Wood. The book will be issued to subscribers at 5s. net. Dr. Green, 31, Shrewsbury Road, Birkenhead, will be glad to receive names of subscribers. Owing to the numerous illustrations, both of the plants themselves and of the scenery of the district, this book will be of more than merely technical interest, and will be of value to all who wish to know something of its Flora.

JOHN STORRIE, who died at Cardiff on May 2, was born at Muiryett, Cambusnethan, Lanarkshire, on June 2, 1843. In his early years he was apprenticed to a printer, and went from Scotland to various parts of England and Wales. From a lad he had shown a taste for knowledge of all kinds, and especially for botany; when quite young he obtained a prize for a collection of Scottish alpine plants He became employed on the Cardiff *Western Mail*, and was appointed Curator of the Museum in that town. After a time he came to London, where he acted as curator of the collection of C. O. Groom Napier, calling himself "Prince of Mantua and Montferrat"; Storrie's account of the proceedings of this extraordinary person was extremely amusing. Later he returned to Cardiff, and again became Curator of the Museum. In 1886 he published a *Flora of Cardiff*, a notice of which appeared in this Journal for 1887. Storrie was elected an Associate of the Linnean Society in 1899; a fuller account of him will be found in the Society's *Proceedings* for 1900–1.

FRANCIS DICKINSON, the latest surviving contributor to Leighton's *Flora of Shropshire* (published in 1841), in which his name is of frequent occurrence, died at his residence, Wheatlands, Crookham Hill, Edenbridge, Kent, on August 24th. He was born January 4th, 1816, at Coalbrookdale, Shropshire, and, although his name is only familiar in connection with Leighton's work, was throughout his life interested in botanical pursuits.

AT the meeting of the Linnean Society on Nov. 7th, the following specimens were exhibited for Mr. W. B. Hemsley:—(1) A West Australian Umbelliferous shrub, *Siebera deflexa*, which produces tubers, called "Yuke" by the aborigines, who eat them both raw and cooked. Many shrubs in dry countries form large tuberous stocks, from which annual stems spring; but the tubers of *Siebera deflexa* grow in strings showing no trace of eyes or buds, but scars where stems may have been detached. Whether independent plants spring from the separate tubers is a question which remains to be determined. (2) Germinating seeds of *Araucaria Bidwillii*, received from Grahamstown. The peculiarity in the germination is that there are two distinct stages; in the first stage the radicle emerges from the shell of the seed, eventually bringing out the petioles of the cotyledons and the axis of the plantlet. The radicle grows in a carrot-shaped woody body, from which the petioles of the cotyledons disarticulate, leaving a few minute rudimentary leaves forming the point of the plumule. After some weeks, the second stage begins with the elongation of the plumule, which eventually becomes the trunk of the tree. It appears that the second stage may be delayed a considerable time without loss of vitality. The germination of the seeds of *Araucaria Bidwillii* had been previously observed, and the process has been described and illustrated in Regel's *Gartenflora*, 1865, p. 103; but the two stages of growth escaped notice. Another peculiarity is there pointed out: each seed contained two or more embryos, which germinated and grew, so that one hundred and sixty-four plants were raised from seventy-five seeds.

We have received the three first numbers of the *Bulletin du Jardin Impérial botanique de St. Pétersbourg*, in which it is intended to publish original papers in all branches of botany, as well as communications relating to or emanating from the Garden itself; it is edited by Dr. A. Fischer von Waldheim. The contributions in the numbers before us deal principally with lichens and fungi, and are in the Russian tongue; both typography and plates are excellent. We would suggest that each number should contain the date of its publication.

Sir George King is continuing in the *Journal of the Asiatic Society of Bengal* his important publication "Materials for a Flora of the Malayan Peninsula." The last instalment deals principally with *Eugenia*, of which 96 species, many of them new, are described.

In a paper read lately by Mr. H. Stuart Thompson before the Scientific Society of the Midland Institute, Birmingham, it was proposed to form a "Midland Herbarium" to be kept in Birmingham. In the course of his paper Mr. Thompson gave some interesting facts concerning the vegetation which appeared on the dry bed of Rotton Park Reservoir after the droughts of 1893, 1900, and the present year. He called attention to the flora of a little copse near Harborne containing marshy pools which are being filled with refuse by the Birmingham City Council, who rent the land as a "tip." It appears that this piece of waste land, only four miles from the centre of Birmingham, is the home of many and scarce plants; Mr. Thompson showed dried specimens, including some rare sedges, which he had gathered at Harborne. He had done his best to try and prevent the continuance of the tipping of rubbish, but feared it was one of the sad but inevitable consequences of the extension of our big cities.

Prof. John Percival, of the South-Eastern Agricultural College, Wye, Kent, proposes to issue a limited number of fascicles of specimen ears of the chief European varieties of the cereals Wheat, Barley, Oats, and Rye. Over two hundred varieties will be represented, and it is hoped that the sets may be found useful for educational purposes, and at the same time be valuable as a record of the varieties of cereals most commonly grown in Europe at the beginning of the twentieth century. The price of each set will be two guineas.

By the death of Alfred Hutchinson Smee, botany as well as horticulture has lost an intelligent supporter. Though Mr. Smee would probably have disclaimed the style of botanist, he was certainly attached to the study of that science. The son of Mr. Alfred Smee—who made a garden on a piece of marsh land along the course of the Wandle near the watercress beds at Mitcham, and wrote a book about it, *My Garden*, well known to garden-lovers—he had gone on with the work on his father's lines. In a comparatively small area he had continued the accumulation of a large selection of interesting plants. I look back with pleasure to a long hour which he devoted one evening last May to showing me some of what he termed his "rubbish," by which he meant plants of botanic rather than horticultural interest. The immediate object of my visit was a *Philodendron* which proved a new species, and was described in a recent number of this Journal (p. 277). But he had also an interesting, if small, collection of orchids, and, among other things, a splendid specimen of *Cytisus Adami* in full flower, showing the yellow, purple, and intermediate colours on distinct branches. Mr. Smee was conducting a series of experiments on this curious tree—rearing young trees from seeds of flowers of the respective colours, in order to study the course of variation. Mr. Smee was a member of the Council of the Royal Horticultural Society, and also took great interest in promoting horticulture in his own neighbourhood. He was, in fact, a most active and useful man in all matters of local interest. He was born in Finsbury Circus in 1841, and died at his house, The Grange, Hackbridge, on November 8th.—A. B. R.

The latest addition to the handsome monographs of African plants issued under the editorship of Prof. Engler is the *Anonaceæ*, which have been undertaken by the editor and Dr. Diels. Thirty admirable plates accompany the monograph, in which many new genera are established, apparently on slight grounds. The new parts of *Das Pflanzenreich* contain the *Symplocaceæ*, by Dr. A. Brand, and the *Rafflesiaceæ* and *Hydnoraceæ*, by Graf zu Solms-Laubach.

The first part of vol. ix of the *Annals of the Royal Botanic Garden, Calcutta*, consists of "a second century of new and rare Indian plants," by Sir G. King, Dr. Prain, and Mr. J. F. Duthie. A new genus of Leguminosæ, *Leucostegane*, is established by Dr. Prain on his *Saraca latistipulata*; the excellent plates have been drawn by native artists under his supervision. A beautiful photogravure of *Albizzia Richardiana* forms the frontispiece to the volume.

The fourth part of Mr. F. M. Bailey's *Queensland Flora* contains the orders *Hydrophyllaceæ* to *Elæagnaceæ*, with 18 plates, illustrating *Nepenthes* and other genera of special interest.

We are indebted to the Editors of *The Garden* for permission to reproduce, as frontispiece to the present volume, the very excellent portrait of Mr. J. G. Baker which appeared in their issue for Nov. 9.

INDEX.

For Classified Articles, see—Articles in Journals; County Records; Obituary; Reviews. New genera, species, and varieties published in this volume, as well as new names, are distinguished by an asterisk.

Abietia, 41
Acorus in Cheshire, 38
Æolanthus, 140
African Flora, 39, 48, 108 (rev.), 254 (rev.), 280, 354; Mosses, 364; Convolvulaceæ, 12, 55; Labiatæ, 108, 140; Sterculiaceæ, 122; Acanthaceæ, 300
Agardh, J. G., 143; his 'Species Algarum' (rev.), 245
Agathosma stricta,* 398
Aloe natalensis, 170
Algological Notices (rev.), 111
Allionia, 68
Alopecurus hybridus, 232
Amaryllideæ, Bulbiform seeds of, 369
American nomenclature, 119, 190
Anomodon Toccoæ, 360; tristichus, 364
Antennaria dioica var. hyperborea, 217 (t. 423)
Arabis ciliata, 207
Araucaria Bidwillii, 434
Arcyria, 89
ARTICLES IN JOURNALS:—
  Annals of Botany, 78, 188, 285, 431, 433
  Annuario Ist. Bot. di Roma, 116, 216
  Bot. Centralblatt, 45
  Bot. Gazette, 45, 78, 116, 149, 188, 214, 253, 285, 319, 351, 431
  Botanical Magazine (Tokio), 431
  Bot. Notiser, 45, 116, 188, 214, 351, 431
  Bot. Zeitung, 78, 116, 149, 214, 253, 285, 319, 351, 431
  Bull. de l'Herb. Boissier, 116, 149, 188, 214, 253, 285, 319, 351, 431
  Bull. Bot. Soc. Belgique, 116, 285
  Bull. Jard. Bot. St. Pétersbourg, 435
  Bull. Soc. Bot. France, 116, 214, 253, 351, 431
  Bull. Torrey Bot. Club, 78, 116, 149, 188, 214, 253, 285, 319, 351, 432
  Bull. U.S. Dept. of Agriculture, 113, 150, 248, 286
  Gardeners' Chronicle, 45, 78, 117, 150, 188, 214, 253, 285, 319, 351, 432
  Journ. de Botanique, 45, 78, 150, 188, 215, 253, 285, 319, 432
  Journ. Linn. Soc., 188, 319
  Journ. R. Hort. Soc., 356
  Malpighia, 117, 253, 432
  Minnesota Botanical Studies, 319
  Notes fr. Bot. School, Trin. Coll. Dublin, 80
  Nuovo Giorn. Bot. Ital., 285, 351
  Oesterr. Bot. Zeitschrift, 45, 78, 117, 150, 188, 253, 285, 319, 352, 432
  O. S. U. Naturalist, 80
  Rhodora, 78, 117, 150, 188, 254, 285, 319, 432
  Trans. Linn. Soc., 150, 432
  Trans. Leicester Lit. & Phil. Soc., 80
  Trans. Yorks. Nat. Union, 254
Astrochlæna Delamereana,* 60; involuta,* 59; malvacea var. epedunculata,* 59
Athanasia montana, 171
Athrixia arachnoidea, 170
Aublet's 'Histoire des Plantes,' 36
Australian Figs (t. 417), 1

Bacteria disease in Turnips, 33
Badhamia, species of, 82; versicolor,* 81 (t. 419); cultivation of, 6
Bagnall, J. E., Flora of Staffordshire, Supplement; Camptothecium nitens, 187; Octodiceras Julianum, 243
Bailey's 'Cyclopædia' (rev.), 42; his 'Botany' (rev.), 76
Baker, E. G., British Violets, 9, 220; African Sterculiaceæ, 122
Baker, J. G., Plates of 'English Botany,' 286; portrait (frontispiece)

Banks & Solander's Figs (t. 417), 1; Australian Plants (rev.), 348
Barker of Beccles, 73
Barringtonia, 67
Barton, E. S., Galls in Furcellaria and Chondrus (t. 418), 49; Sporangia of Ectocarpus, 51; Algological Notices, 111; J. G. Agardh, 143; his 'Species Algarum' (rev.), 245; Dictyosiphon (rev.), 251
Bauer's 'Exotic Plants,' 107
Beckwith, W. E., Shropshire Plants, 182
Benbow, J., Middlesex Orchids, 278
Bennett, A., Viola nana, 72; Potamogeton, 198; I. of Man botany, 212, 244; Moenchia, 428
Betula alpestris, 271
Bibliographical Notes, 107, 202, 237
'Biltmore Botanical Studies,' 255
Blepharis extenuata,* 301; Scullyi,* 301
Bonnier's 'Cours de Botanique' (rev.), 148
Bornean Monocotyledons, 173
Botany, Teaching of, 341
Botanical Exchange Club Report, 207
Botanical Work, Report of Committee on, 305
Box in Britain, 27, 73
Braithwaite's 'Moss Flora,' 79
Bretschneider, Emil, 287
Bretschneidera, 215
Bristol Plants, 91
British Botany in XIX Century, 128
British Hepaticæ, Key to, 154
British Museum Herbarium, 307; Report of, 1900, 424
Britten, J., Acorus in Cheshire, 38; Welwitsch's African Plants (rev.), 39; Bailey's Cyclopædia (rev.), 42; Nicholson's Supplement (rev.), 43; Changes in Nomenclature, 67; Suffolk Note, 72; Notes on Lathyrus, 96; Bauer's Exotick Plants, 107; African Labiatæ, 140; Plant-names (rev.), 146; Statice pubescens, 195; Periodical Publications, 237; Plates of 'English Botany,' 245; Rubia rotundifolia, 278; 'Flora Capensis' (rev.), 280; Limonium humile, 315; 'Flora of California' (rev.), 347; Botany of Cook's Voyage, 348; Botanica in Italia (rev.), 393
Bruce, G. L., Galium sylvestre, 245
Bucknall, C., Box in Britain, 29; Bristol Plants, 91
Buda media var. glandulosa, 207
Buddle, note by, 72
Bulbiform seeds of Amaryllideæ, 369
Bullock-Webster, G. R., Characeæ Records, 101
Burkill, I. H., Trifolium pratense var. parviflorum, 235
Buxus in Britain, 27, 73

Camptothecium nitens, 187
Cape Plants, new, 397
Cardamine impatiens, 245
Carex depauperata, 244; binervis × rigida, 274; Worcester species, 244
Careya, 68
Carruthers, W., Disease in Turnips, 33; Cherry tree disease, 118; Botany of Cook's Voyage (rev.), 348
Catalase, 286
Centaurea Scabiosa var., 268
Ceratothamnion, 253
Cerion, 433
Ceterach hybrid? 117
Chamberlain's Histology (rev.), 349
Characeæ Records, 101
Cherry tree disease, 118
Chondrioderma, species of, 85–7
Chondrus, Galls in (t. 418), 49
Christ's 'Farnkräuter der Schweiz,' 190
Cirsium arvense, 91
Clarke, W. A., British Botany in XIX Cent., 128; Radnor Plants, 279
Clements' 'Nebraska,' 190
Clyde Area, Nat. Hist. of, 433
Cochlearia, 216
Cocks, Ll. J., Yorkshire Mosses, 37
Coleus somalensis,* 265
Comère's 'Desmidiées de France' (rev.), 250
'Coniferæ,' Veitch's (rev.), 40
Connellia, 151
Convolvulaceæ, African, 12, 55
Convolvulus Bullerianus,* 62; Hilsenbergiana,* 61; liniformis,* 61
Cook's Voyage, Botany of, 348
Cooke's (T.), Bombay Flora (rev.), 392
Coulter & Chamberlain's 'Spermatophytes' (rev.), 246
Coulter's Indiana Catalogue, 119
County Records:—
  Beds, 73, 82
  Berks, 28, 99, 225, 235
  Brecon, 105, 168, 344

Cambridge, 101, 102, 385
Carmarthen, 168, 344
Carnarvon, 90, 105
Chester, 10, 38, 208
Cornwall, 146, 187
Cumberland, 191, 369
Devon, 9, 89, 428
Dorset, 49, 82, 84, 87, 385
Essex, 82, 315, 396
Glamorgan, 336
Gloucester, 29, 91, 146
Hants, 79, 101, 144, 151, 320
Herts, 73, 82
Huntingdon, 428
Kent, 28, 179, 187, 207, 227
Lancaster, 10, 22, 227, 277, 296
Leicester, 80
Merioneth, 10, 71, 84, 87, 276
Middlesex, 245, 278, 345
Norfolk, 84, 101, 235
Northampton, 428
Oxford, 209, 226, 245
Pembroke, 52, 279
Radnor, 209, 279
Shropshire, 182, 276
Somerset, 74, 91, 101, 244
Stafford (Supplement), 72, 225
Suffolk, 72
Surrey, 27, 207, 235, 345, 369, 428
Sussex, 121, 235, 403, 428
Warwick, 232, 352, 435
Westmoreland, 105
Wilts, 83
Worcester, 187, 243, 244, 352, 428
Yorks, 37, 38, 73, 82, 223, 245, 277, 344, 346, 369
(*See also* Brit. Botany in XIX Century, pp. 128–140.)
Crassula tenuis,* 399
Cumbia, 68; australis,* 68
Cycadaceæ, 46
Cymbidium Sparkesii, 197
Cyperus fuscus, 93

Dates of Humboldt & Bonpland's 'Voyage,' 203; of French Voyages, 205
Deasy's 'Tibet and Turkestan,' 216
Dendrobium Jonesii,* 197
Dennet's 'Plant Life,' 46
Dianema corticatum, 96
Dichæa elegans, 87
Dictis umbonata,* 104
Dickinson, Francis, 434
Didymium, cultivation of, 7; comatum, 7; difforme, 7; dubium, 87; Trochus, 88
Dinochloa Tjankorreh, 179
Dipodium paludosum, 175
Disease in Turnips, 33; in Plants (rev.), 210
Dixon, H. N., Varieties of Hypnum fluitans, 275
Dod, Major A. H. Wolley-, New Cape Plants, 397
Dombeya, 124; Taylori,* 125
Dorsett on Violet Disease, 248

Ectocarpus, Sporangia of (t. 418), 51
Elliott, E. J., Hypnum rotundifolium, 146
'English Botany,' plates of, 245, 280
Eria Hosei,* 174
Erophila virescens, 207
Euphrasia, 92, 270, 391; scottica, 343
Evans, M. S., New Natal Plants, 169
Exoascus deformans, 150
Extinction of Plants, 255

Ficus, Australian species, 1; glomerata, 4; cauliciflora, 5; opposita, 3; Parkinsoni * (t. 417), 1; platypoda, 3; virginea,* 2
Fitchia, 46
'Flora Brasiliensis,' 255
'Flora Capensis' (rev.), 280
'Flora Sinensis,' delay of, 288
Fontinalis antipyretica var. cymbifolia,* 427
Foslie's Chinese Corallinaceæ, 120
Fry, David, Bristol Plants, 91
Fuligo ellipsospora, 84; ochracea, 84
Furcellaria, Galls in (t. 418), 49

Galium sylvestre, 245
Galls in Furcellaria and Chondrus (t. 418), 49
Geigeria natalensis, 172; rivularis, 171
Geniosporum fissum,* 263
Gepp, A., Mueller's 'Genera Muscorum' (rev.), 74; Horrell's 'Sphagnaceæ' (rev.), 112
Geranium purpureum, 208
Gerard, J., 'Story of Wild Flowers' (rev.), 394.
Gerassimow on Cells, 396
Ghikæa, 316
Globba affinis,* 146
Glœocalyx, 433
Glyceria Borreri, 428; pedicellata, 274

Greene's 'Literary Aspects of American Botany,' 189
Griffin, W. H., Lonicera Xylosteum, 187
Groves, H. & J., Ranunculus × Hiltoni,* 121 (t. 420)
Guernsey, Flora of, 216

Habenaria albida × conopsea, 272
Hamilton, W. P., Kirkcudbright Mosses, 422
Hayling Island Plants, 144
Helianthemum vulgare, 345
Heliophila tabularis,* 397
Heller's Catalogue of North American Plants, 119, 190; his 'Muhlenbergia,' 119
Hemimeris, 103; elegans,* 102
Henslow's 'Poisonous Plants,' 287; 'Wild Flowers' (rev.), 394
Hepaticæ, New British, 36; Key to British, 154; Yorkshire, 245
Hermannia, 126; damarana,* 127; Donaldsoni,* 126; Eenii,* 126; rudis,* 398
Hevea, 189
Hieracia, Linton's Set of, 105, 146; Scottish, 269
Hieracium caledonicum var. platyphyllum,* 166; rigidum var. strigosum,* 167; vulgatum var. cacuminum,* 66
Hiern, W. P., Banks & Solander's Australian Figs, 1 (t. 417); his Welwitsch Catalogue (rev.), 39; New S. African Scrophulariaceæ, 102; Flora of Tropical Africa (rev.), 108; Williams's 'Prodromus Fl. Brit.' (rev.), 212, 429; Limosella aquatica var. tenuifolia (t. 426), 336
Hobkirk, C. P., Tortula cernua, 37
Hodgson, William, 191
Hogan's Gaelic Names (rev.), 147
Holmes, E. M., Kent Mosses, 179, 227
Holmes, G., Hypnum rotundifolium, 146
Homonyms, 288
Horrell's 'Sphagnaceæ' (rev.), 112
Hose's Bornean Monocotyledons, 173
Howe's 'Torreya,' 119
Humboldt & Bonpland's 'Voyage' (dates of), 202
Hume, A. O., Impatiens Roylei, 187; Scirpus maritimus, 145
Huttum, 67; acutangulum,* 67; calyptratum,* 67; edulis,* 67; racemosum,* 67; speciosum,* 67
Hypodiscus capitatus,* 402; Dodii,* 402
Hypnum fluitans var. atlanticum,* 277; var. Robertsiæ,* 275; var. squalidum,* 276; rotundifolium, 146

Ianthe, 289; species of,* 292; stellata, 294 (t. 425)
Impatiens Roylei, 187
Ingham, W., Yorkshire Mosses, 73; Hepatics, 245, 346
International Botanical Association, 189
Introduced Plants, 320
Inula vulgaris, 213
Ipomœa bellecoma,* 15; crassipes, 14; crepidiformis var. minor,* 20; Eenii,* 21; Gerrardiana,* 21; gracilisepala,* 12; Hierniana,* 58; Hindeana,* 13; Hovarum,* 58; kentrocarpa, 55; kilimandschari, 21; Lambtoniana,* 12; oblongata, 13; ovata, 19; prætermissa,* 56; Randii,* 18; Rhodesiana,* 57; Robertsiana,* 18; sarmentacea,* 15; Scotellii,* 18; Welwitschii, 57
Irish Plants, 187, 207, 221, 316, 343; Rubi, 378
Isle of Man Plants, 212, 244
Itoa, 215

Jackson, A. B., Alopecurus hybridus, 232
Jackson, B. D., Aublet's 'Histoire,' 36; Legré's Botanique en Provence (rev.), 43; St. Lager's Abrotonum (rev.), 284
Jackson, J. R., leaving Kew, 320
Jepson's Californian Flora, 347
Jersey Plants, 64, 208, 209
Jones, Arthur Coppen, 191
Jungermaniæ, New British, 37; saxicola, 279
Justicia Baumii,* 304; Smithii,* 304; Taylorii,* 303

Keisuké, Ito, 320
Kent Mosses, 179
Kent's 'Coniferæ' (rev.), 40
Kew Publications, 48, 287, 288, 354, 355, 433; Herbarium, 308
King, Sir G., Bombay Flora (rev.), 392

Lathyrus, Notes on, 96; Alberjilla, 96; magellanicus, 97; nervosus, 98; parisiensis, 98
Legré's Rauwolf & Raynaudet (rev.), 43
Lepidoderma tigrinum, 88 (t. 419)
Lepigonium marinum var. apterum,* 268
Leptodontium recurvifolium, 187
Lester, L. V., Jersey Plants, 64
Lett, H. W., Leptodontium recurvifolium, 187; New Irish Mosses, 343
Leucostegane, 436
Leurocline* lithospermoides,* 257 (t. 424)
Ley, A., Welsh Hawkweeds, 167
Limonium lychnidifolium var. compressum* (t. 422), 193; humile, 315
Limosella aquatica var. tenuifolia (t. 426), 336
Linnean Society, 46, 189, 215, 286, 434
Linton, W. R., Pembrokeshire Plants, 52
Linton's British Hieracia, 104, 145
Lister, A., Cultivation of Mycetozoa from Spores, 5; Notes on Mycetozoa, 81 (t. 419)
Liverpool, Flora of, 434
Lloyd's (C. G.) Mycological Notes, 249
Lobelia urens, 428
Lonicera Xylosteum, 187
Loew on Catalase, 286
Lycogala flavo-fuscum, 90
Lyellia, 340; Lescurii,* 341
Lythrum rivulare, 178

McAlpine's Diseases of Citron Trees, 47
MacDougal's Physiology (rev.), 349
Macvicar, S. M., New British Hepaticæ, 36; Key to British Hepaticæ, 154; Scapania crassiretis, 210; Jungermania saxicola, 315
Maize, effect of pollen in, 113
Margarita metallica, 90
Marquand's Flora of Guernsey, 216
Marsdenia spissa, 260
Marshall, E. S., Hayling Island Plants, 144; Plants of N. Scotland, 266; 'Irish Topographical Botany' (rev.), 316; Plants of S.W. Scotland, 389
Martin, W. K., Lobelia urens, 428
Matricaria subulosa,* 399
Matthews, William, 352, 428
'Meddlanden Stockholms Bot. Institut,' 216
Melhania, 122; albicans,* 123; apiculata,* 124; Taylori,* 123
Melvill, J. C., William Rogers, 395
Merremia Bowieana,* 63; malvæfolia,* 63
Miall on plant extermination, 256
Michelmore, P., Cardamine impatiens, 245
Migula's Cryptogamic Flora, 353
Moenchia quaternella, 365, 428
Monilia Glastii,* 385
Moore, Spencer Le M., Alabastra Diversa (t. 424), 257; African Acanthaceæ, 300; L'Héritier's Species of Relhania, 386
Moss Exchange Club Report, 353
Mosses, Yorkshire, 38, 73, 347; Elgin, 94; Kent, 179, 229; W. Lancashire, 294; Irish, 343; African, 364; Notes on, 339, 357
Mueller's 'Genera Muscorum' (rev.), 74
Muraltia brachypetala,* 397; demissa,* 397; recurva,* 397
Murbeck's Dictyosiphon (rev.), 251
Murray, G. R. M., Box in Britain, 27; Report Bot. Dept. Brit. Mus. 1900, 424
Murray, R. P., Rubus criniger, 74
Mycetozoa cultivation, 5; notes on, 81 (t. 419)
Myosotis versicolor, 209
Myxobacteria, 69
Myxococcus pyriformis,* 71

Namaqualand, 344
Natal Plants, 169, 255
Nelitris, 68; Timon,* 68
Neomüllera damarensis, 265
Neonicholsonia, 351
Neuracanthus gracilior,* 302
Newspaper Botany, 192, 255, 354
Nicholson, G., leaving Kew, 320; his Handlist of Trees, 433; his Dictionary of Gardening, 42, 254
Nicholson, W. E., Fontinalis antipyretica var. cymbifolia,* 427
Niebuhria, 68; biflora,* 69; spilanthoides,* 69
Nomenclature, notes on, 36, 39, 67, 96, 119, 141, 281, 288

Oberonia Hosei,* 173

OBITUARY :—
  Agardh, Jacob George, 143
  Bretschneider, Emil, 287, 288
  Dickinson, Francis, 434
  Hodgson, William, 191
  Jones, Arthur Coppen, 191
  Keisuké, Ito, 320
  Matthews, William, 352, 428
  Rogers, Thomas, 395
  Smee, Alfred Hutchinson, 436
  Smith, Robert (portr.), 30
  Storrie, John, 434
  Sutherland, Peter Cormack, 191
  West, William, 353
  Yonge, Charlotte Mary, 192
Octodiceras Julianum, 243
Oligotrichum Lescurii, 341
Omania,* 258; arabica,* 258 (t. 424)
Orobanche amethystea, 428
Orobus, notes on, 96; Piscidia, 100; pyrenaicus, 100
Orthosiphon gofensis,* 263
Orton, Wilt-Disease of Cotton, 249

Parasia Thomasii,* 260
Peach Leaf-curl, 150
Percival, J., Euphrasia scottica, 343
Periodicals, dating and indexing of, 237
Philippia keniensis,* 259
Philocrya, 339
Philodendron crassum,* 277
Phylica Dodii,* 399
Physarum, species of, 82–4
Pinanga lepidota,* 177
Piperia, 253
Plant-names, 146
Platyclinis brevilabrata,* 173
Plectranthus, 141; keniensis,* 264
Plowright, C. B., New British Fungi, 385
Poa trivialis, var., 209
Pogonatum microstomum (t. 427), 359; paucidens, 359
Polyporus Euonymi, 384
Potamogeton acutifolius, 200; angustifolius, 201; crispus, 201; dimorphus, 200; Faxoni, 199; fluitans, 198; lucens, 199; nitens, 199; polygonifolius, 198; pusillus var. capitatus,* 201; var. pseudo-rutilus,* 201
Potentilla sericea var. Deasyi, 216
Pothos Hosei,* 178
Pounds' 'Nebraska,' 190
Praeger's Irish Botany, 316
Prototricha flagellifera, 90
Pseudosopubia Delamerei,* 261
Publication in two places, 288

Queensland Orchids, 197
Quelchia, 151

Ranunculus × Hiltoni,* 121 (t. 420); scoticus, 207
Rauwolf, 44
Raynaudet, 44
Razumovia, 69; hispida,* 69
Relhania, species of, 386; cuneata var. virgata,* 387; laxa var. humilis,* 387; paleacea var. Bellia-strum, 389
Rendle, A. B., African Convolvulaceæ, 12, 55; Manual of Coniferæ (rev.), 40; Bailey's 'Botany' (rev.), 76; Strasburger's 'Botany,' (rev.), 114; Wishart's 'Self-Educator' (rev.), 115; Bonnier & Sablon's 'Botanique' (rev.), 148; Hose's Bornean Monocotyledons, 173; Queensland Orchids, 197; Coulter's Spermatophytes (rev.), 246; Philodendron crassum,* 277; Wettstein's 'Handbuch' (rev.), 281; M. Ward's 'Grasses' (rev.), 283; Ghikæa, 316; Notes on Trillium (t. 426), 321; American Text-books (rev.), 349; Bulbiform seeds of Amaryllideæ, 369
REVIEWS :—
  Welwitsch Catalogue. W. P. Hiern, 39
  Manual of Coniferæ. A. H. Kent, 40
  Cyclopædia of Horticulture. L. H. Bailey, 42
  Supplement to Dict. of Gardening. G. Nicholson, 43
  La Botanique en Provence. L. Legré, 43
  Genera Muscorum. C. Mueller, 74
  Botany. L. H. Bailey, 76
  Flora of Tropical Africa, 108
  Algologische Notizen. N. Wille, 111
  European Sphagnaceæ. C. E. Horrell, 112
  Xenia. H. J. Webber, 113
  Botany. E. Strasburger, 114
  Botany. R. S. Wishart, 115
  Flore Populaire. E. Rolland, 146
  Gaelic Plant-names. E. Hogan, 147
  Cours de Botanique. G. Bonnier & L. du Sablon, 148

REVIEWS (*continued*)
  Disease in Plants. H. M. Ward, 210
  Prodr. Floræ Britannicæ. F. N. Williams, 212, 429
  Species Algarum. J. G. Agardh, 245
  Morphology of Spermatophytes. J. M. Coulter & C. J. Chamberlain, 246
  American Papers on Fungi, 248
  Desmidiées de France. J. Comère, 250
  Dictyosiphon. S. Murbeck, 251
  Flora Capensis, 280
  Systematischen Botanik. R. v. Wettstein, 281
  Grasses. H. M. Ward, 283
  Abrotonum. Saint-Lager, 284
  Irish Topographical Botany. R. Ll. Praeger, 316
  Flora of California. W. L. Jepson, 347
  Botany of Cook's Voyage, 348
  Plant Physiology. D. T. MacDougal, 349
  Plant Histology. C. J. Chamberlain, 350
  Bombay Flora. T. Cooke, 392
  Botanica in Italia. P. A. Saccardo, 393
  Wild Flowers. G. Henslow, 394
Riddlesdell, H. J., Brecon and Carmarthen Plants, 344; Helianthemum vulgare, 345
Roella amplexicaulis,* 400
Rogers, Thomas, 395
Rogers, W. M., N. Ireland Rubi, 378
Roland's 'Flore Populaire' (rev.), 146
Rosa dumetorum, 209; pimpinellifolia × canina, 208
Rubi, N. Ireland, 378; Scottish, 390
Rubia rotundifolia, 278
Rubus criniger, 74; dunensis,* 382; Lettii,* 381

Saccardo's 'Botanica in Italia' (rev.), 393
Saint-Lager's 'Abrotonum,' 284
Salmon, C. E., Limonium lychnidifolium var. compressum* (t. 422), 193; Sussex Plants, 403
Salmon, E. S., Thuidium Brotheri,* 153 (p. 421); Bryological Notes, 339, 357
Scapania crassiretis, 210
Schinz, Hans, 'Namaqualand,' 344
Schrenk on Polyporeæ, 248
Scirpus maritimus, 145
Scolopendrium hybrid?, 11
Scottish Plants, 32, 36, 81–90, 94, 105, 106, 210, 218, 221–226, 235, 266, 279, 315, 385, 398, 422
Sebæa gibbosa,* 401; ochroleuca,* 400; rara,* 401
Seeds, Bulbiform, of Amaryllideæ, 369
Senecio seminivea, 169; tugelensis, 169
Sherborn, C. D., Dates of Humboldt's 'Voyage,' &c., 202
Shropshire Plants, 182
Siebera deflexa, 434
Smee, Alfred Hutchinson, 436
Smith, A. L., Disease in Turnips, 33; 'Myxobacteria, 69; Xenia (rev.), 113; 'Disease in Plants' (rev.), 210; Papers on Fungi (rev.), 248
Smith (E. P.) on Pseudomonas, 249
Smith, Robert (portr.), 30
Smith, W. G., Box in Britain, 73
Sphagnaceæ, European (rev.), 112
Spiranthes Romanzoffiana, 343
Stabler, G., Jungermania saxicola, 279
"Statice pubescens Sm.," 195
Stemonitis splendens, 89
Stœbe rosea,* 399
Storrie, John, 434
Strasburger's 'Practical Botany' (rev.), 114
Streptocarpus Armitagei,* 262; Vandeleuri,* 262
Suæda cæspitosa,* 401
Sutherland, Peter Cormack, 191
Symplostemon, 39

Teaching of Botany, 341
Thelephora vitellina,* 385
Thompson, H. S., Worcestershire Carices, 244; Carex depauperata, 244
Thuidium Brotheri,* 153 (t. 421)
Thunbergia Elliotii,* 300
Timonius, 68
Tortula cernua, 37; prostrata (t. 427), 357
Towndrow, R. F., Pembroke plants, 279; W. Matthews, 428
Trichamphora pezizoidea, 85
Trifolium pratense var. parviflorum, 235
Trillium, Notes on, 321; affine,*

334; camtschaticum, 329; Catesbæi, 333; cernuum, 332; discolor, 326; erectum, 327; grandiflorum, 330; lanceolatum, 327; ovatum, 330; pusillum (t. 426), 334; recurvatum, 327; Rugelii* (t. 426), 331; sessile, 321; Tschonoskii, 329; Vaseyi, 329; viride, 326
Turnips, Disease in, 33

Ulex nanus, 244
Ursinia brevicaulis, 172

Veitch's 'Coniferæ' (rev.), 40
Velvitsia, 39
Viola, British, 9, 220; carpatica, 10, 227; Curtisii, 10; lepida, 221; lutea, 221; monticola, 225; nana, 11, 72; Pesneaui, 9; Provostii, 225; Sagoti, 226

Wahlenbergia depressa,* 400
Ward's (H. M.) 'Disease in Plants' (rev.), 210; 'Grasses' (rev.), 238
Weathers's 'Garden Plants,' 79
Webber's 'Xenia' (rev.), 113
Weissia crispa, 180
'Welwitsch Catalogue' (rev.), 39
West, W., 'Desmidiées de France' (rev.), 250; his Yorkshire algæ, 254; on Ceylon algæ, 286; Spiranthes Romanzoffiana, 343
West, W., Junr., 353
Wettstein's 'Handbuch' (rev.), 281
Wheldon, J. A., Lancashire Plants, 22; Mosses, 294; Elgin Mosses, 94; Orobanche amethystea, 428
White, J. W., Bristol Plants, 91
Whitwell, W., Wandsworth Plants, 345; Glyceria Borreri, 428
Wille's 'Algologische Notizen' (rev.), 111
Williams, F. N., Antennaria dioica var. hyperborea, 217 (t. 423); Ianthe (t. 425), 289; Moenchia, 365; his 'Prodromus Fl. Brit.' (rev.), 212, 429
Wilson, A., Lancashire Plants, 22; Mosses, 294
Wishart's 'Self Educator' (rev.), 115
Wolley Dod—*see* Dod
Wood, J. M., Natal Plants, 169, 255
Woodward, B. B., Dates of Humboldt's 'Voyage,' etc., 202
Worsdell on Cycadaceæ, 46

Xenia (rev.), 113
Xysmalobium Schumannianum,* 259

Yonge, Charlotte Mary, 192; her 'Keble's Parishes,' 79

Zyganthera, 255

ERRATA.

P. 12, l. 16 from top, for "Congo" read "Niger."
P. 48, l. 21 from top, for "work" read "*Flora Capensis.*"
P. 48, l. 30, for "work" read "*Flora of Tropical Africa.*"
P. 90, l. 24 from top, dele "since 1895."
P. 142, l. 15 from top, for "herb." read "Lab."
P. 245, l. 20 from bottom, for "Whichelmore" read "Michelmore."
P. 248, l. 16 from top, for "*Cruciferæ*" read "*Coniferæ.*"

WEST, NEWMAN AND CO., PRINTERS, HATTON GARDEN, LONDON, E.C.

THE

FLORA OF STAFFORDSHIRE

BY

JAMES E. BAGNALL, F.L.S.

ISSUED AS A SUPPLEMENT TO THE 'JOURNAL OF BOTANY,' 1901.

LONDON:
WEST, NEWMAN & CO., 54, HATTON GARDEN.

1901.

THE FLORA OF STAFFORDSHIRE.

By J. E. BAGNALL, A.L.S.

It is fifty-six years since Dr. Garner published in his *Natural History of Staffordshire* the first complete flora of that county, the nomenclature and classification being that of the fourth edition of Hooker's *British Flora*. The following is an attempt to bring this work level with the times, and to make it more complete I have added the records of the older botanists from all sources within my reach, the list of which is given below. Any published records that I may have omitted will be due to my want of knowledge of their existence. To these I have also added all notes made by myself during my visits to various portions of the county; and in instances where I have seen the plant recorded by one or other of the botanists cited, I have notified this by the sign ! after locality.

I am indebted to Mr. C. E. Salmon, F.L.S., for many records, and for the loan of specimens collected by Joseph Power and other more notable botanists.

To enable the plants enumerated to be more readily located, I have divided the county into districts by means of the four principal rivers—(1) the Weaver; (2) the Dove; (3) the Trent; (4) the Severn. But in some instances, a district mentioned may be in two river basins; as an instance, the parish of Maer is in both Trent and Severn basins, so also in other cases.

1. The Weaver.

The Weaver is a Cheshire river tributary to the Mersey, and receives several streams draining the north and north-west of Staffordshire, the most important being the Dane. This river enters the county north-east of Flash, and is a rapid mountain stream, forming the boundary between Staffordshire and Cheshire, from near Flash to below Bosley; here it passes into Cheshire, and, after a long and varying course, enters the Weaver near Northwick. It drains a considerable portion of North Staffordshire, such as Flash, Quarnford, the Roaches, Gradbach Hills, Swithamley, Rushton Marsh, and much of the country around Biddulph and the east side of Mow Cop. A portion of the county south-west of Biddulph is drained by minor streams tributary to the Wheelock, which enters the Dane near Middlewick, and Checkley Brook, which falls into the Weaver near Nantwich. These minor streams drain the country around Kidsgrove, Audley, Betley, Winkshill, Madeley, and the northern portion of Whitmore. This district is rich in some of the rarer plants.

2. The Dove.

The Dove rises on Axe Edge at an elevation of 1750 ft. above sea, and takes a course south-west near Longnor (forming the boundary between Derbyshire and Staffordshire almost throughout its whole course). Flowing through a narrow valley of about four miles, it passes Hartington, when its course becomes more southerly, through Narrow Glen, Mill Dale, the beautiful Dove Dale, and under Dovebridge; here it receives the Manyfold. The Manyfold is fed originally by a number of streams that flow from the continuation of the limestone ridge of Axe Edge. These collect to the west of Longnor, close to the course of the Dove, and flow southwards, fed at intervals by other streams from the same source. At Hulme End the limestone hills divert its course south-east by Ecton Hill, through the beautiful Wetton Valley, past Ossoms Hill and Thor's Cave to Beeston Tor, where its bed unites with that of the Hamps. The Hamps rises near the Manyfold, and has a southward course of five miles, through Mixon to Onecote, and then south-east to Winkshill, and east to Waterhouses; here the ridge of limestone diverts its course north and north-west to Beeston Tor, and the united streams have a sinuous course southward through Ilam Park, and enter the Dove near Thorpe. The Dove now turns southwards, and continues a winding course through a widening valley, past Mayfield and Rocester, where it receives the Churnet. The Churnet is originally fed by waters from the millstone grit which forms the western portion of the hills near the source of the Manyfold, but it receives numerous contributions from a number of small streams taking the drainage of a semicircle around Leek. These collect at Cheddleton. Here the Churnet enters a beautiful valley, and flows south-east for about twelve miles. As it advances, the hills become more rocky, and the stream flows at the foot of the beautiful grounds of Alton Towers, past Denton and Rocester, to its confluence with the Dove. Continuing to receive feeders from the west, the Dove flows northward to Uttoxeter, being increased by two streams, both coming from the west—Tean Brook and Stoneyford Brook. The Tean has a long course of twelve miles, parallel to the Churnet; the Stoneyford has a shorter one. The Dove now flows south and south-east, past Murchington, Draycote, Scropton, and Tutbury, and enters the Trent near Newton Solney. The total length of the Dove is forty-five miles, and it has a fall of 1550 ft. from its source to its confluence with the Trent.

3. Trent.

The Trent rises in the north-west of the county, between Biddulph and Mow Cop, at about 700 ft. above sea, and, passing through Knypersley Pools, flows southwards through Norton and

Milton, below which it receives a tributary stream, the Fowlea. This stream rises near the source of the Trent, and drains a large area about Tunstall and Burslem. The united streams flow through Hanford and Stoke, receiving on the right bank the Lyme and other streams from the west. Flowing through the large lake in Trentham Park, it continues its south-east course, through Stone, Sandon, Weston-on-Trent, Ingestre, to Great Heywood, where it receives its important tributary, the Sowe. The Sowe rises on the west border of the county, and flows through the lake-like pool Copmere by Eccleshall, and below Chebsey is joined by the Meese, rising on Whitmore Moss; and near here Clanford Brook, which comes in from the west by Ranton Abbey, and flowing past Stafford, is joined by the Penk, which comes from the south above Wolverhampton and brings waters from various streams—Eaton and Whiston brooks from the west of the county, and Sherbrook from Cannock Chase.

The Trent is now a fine river, and, flowing past Shugborough and Wolseley Parks, its course is eastward past Rugeley, Armitage, and the Ridwares to Kings Bromsley, where it receives the river Blithe. This is a small river rising north-west of Chartley Park, and flowing through Gratwick, Blithbridge, Blithfield Park, Blithford, and Blithbury, and drains a large extent of country about Chartley, Kingston, and Abbotts Bromley. The Trent now takes a sinuous course by Wichnor and Alrewas to its confluence with the Tame near Croxall. The Tame rises south of Cannock Chase, and collects tributary waters from the country east of Wolverhampton and Dudley. It flows through Hamstead and Perry, and near Witton enters Warwickshire. After a few miles' sinuous course north-east near Drayton Basset, it has a northern flow, forming the county boundary for a few miles; then it turns west past Tamworth and re-enters Staffordshire. After passing Tamworth it recovers its northern course, flowing by Hopwas and Elford to its confluence with the Trent near Croxall. The Trent now takes the bed of the Tame and turns north-east, flowing by Walton, Drakelow, Stappenhall, and Burton-on-Trent. Here it leaves the county, and after a few miles receives the Dove. Its total length from its source to its confluence with the Dove is about fifty-six miles, and its fall is from 700 ft. at its source, to 180 ft. at its confluence with the Dove.

4. The Severn.

The Severn drains a large extent of west and south-west Staffordshire by small streams tributary to the Tern, Meese, Worf, and Stour, all affluents of the Severn. The river Tern is a brook-like stream forming the county boundary from above Willoughby Wells to a point south-east of Market Drayton, and is fed by streams draining Maer, Maer Heath, and west of Fair Oak. The Meese, a tributary to the Tern, receives Largo Brook, draining Offley Marsh, High Offley, and surrounding country, and has feeders from Norbury and Oulton; and Dawford Brook, draining Weston-under-Lizard and part of Blymhill; and both Largo and Dawford Brooks flow through Aqualate Mere, and near Forton enter the Meese.

Farther south the county is watered by the Stour and its affluents. The Stour enters the county east of Cradley, forming the county boundary for several miles, and draining a thickly populated district, yielding little of botanical interest except the ever-present coltsfoot, and, passing through Stourbridge and Prestwood, receives the Smestow at Stourton. The Smestow with its affluents is far-reaching, receiving waters from Patingham, Wolverhampton, the west side of Dudley, Himley, Trysull, and Enville, and at Stourton joins the Stour. The Stour now takes the course of the Smestow, and, flowing through Kinver and part of Worcestershire, joins the Severn at Stourport. The Severn proper flows through the narrow tongue of Staffordshire in which Arley and Seckley Woods are situated, and is fed by streams from North Wood and Seckley Wood.

AUTHORITIES, BOOKS, &c., QUOTED.

Brown.—Flora of District around Tutbury and Burton, by Edwin Brown, in Mosley's Nat. Hist. of Tutbury (1863).

Bree.—Rev. W. Bree in Purton's Midland Flora (1817–21).

Carter, 1839.—Magazine of Natural History, 1839, pp. 72–76.

Douglas.—List of Stafford plants sent to Watson, 1851 (see Top. Bot. ed. 2, 543).

Fraser, John, M.D.—MS. Notes on the Flora of Staffordshire.

Garn.—Robert Garner, F.L.S. Natural History of Staffordshire (1844–60).

Moore.—In Reports of North Staffordshire Natural History Society (dates various).

N. S. S. Rep.—Reports of North Staffordshire Nat. Hist. Society.

Painter, Rev. W. H.—"Plants seen within six miles of Biddulph Church," &c., in Reports of North Staffordshire Nat. Hist. Society (dates various).

Power.—MS. Notes and specimens, by the favour of C. E. Salmon, F.L.S.

Purchas, Rev. W. H., of Alstonfield Vicarage.—Notes, &c.

Ray, Syn.—Ray, Synopsis, ed. iii. (1724).

Reader, Rev. H. P., of Hawkesyard Priory, Rugeley.—Notes, &c.

Shaw.—Natural History of Staffordshire, List of Plants, by Rev. S. Dickenson, vol. i. pp. 97–115, vol. ii. p. 5; Riley, vol. ii. p. 7; Wainwright, vol. ii. p. 6 (1798–1801).

Stokes.—In Withering's Natural Arrangement of British plants, ed. ii. (1787).

With.—Withering in ditto, ed. iv. edited by William Withering, jun. (1801).

RANUNCULACEÆ.

Clematis Vitalba L. (3) Between Dudley and Wolverhampton; Four Ashes; on trees in Shugborough Grounds; Yoxall Lodges, *Garn.* 381; near Stafford, *Moore.* (4) Compton Holloway, *Fraser*; railway banks, Arley.

Thalictrum flavum L. (3) Hamstall-Ridware, *Wainwright, Shaw*, ii. 7; Burton; Perry Barr! *Garn.* 380; near Stafford, *Douglas*; near Milford, *Reader*; by the Tame near Walsall; Newton Road; Hamstead. (4) Blymhill, *Shaw*, 114; north side of Aqualate, *Garn.* 380; Wightwich, *Fraser*; Trysull; Compton, Trescott.

ADONIS AUTUMNALIS L. (2) Tutbury, *Brown*, 234.

Anemone nemorosa L. Frequent.

A. RANUNCULOIDES L. (3) Growing plentifully on the lawn at Stappenhall Vicarage, *Brown*, 234.

Myosurus minimus L. (3) In a meadow at Elford, E. Bourne, *Shaw*, ii. 7; Hamstall-Ridware Hill, *Shaw*, ii. 7; Barton, *Dashwood*; Burton; Harbourne Reservoir, *Garn.* 363; Tamworth, *J. Power.*

Ranunculus circinatus Sibth. (2) In the Dove, Uttoxeter. (3) Wergs, *Fraser*; near Stafford, *Douglas*; Copmere Pool, *N.S.S. Rep.* 92; Elford; Sherbrook Valley. (4) Perton Reservoir; stream, Trysull.

R. fluitans Lam. (1) In the Dane, Rushton. (2) Dovedale; in the Dove, Uttoxeter; in the Churnet, Alton. (3) Near Stafford! *Douglas*; in the Trent, Colwich; Armitage; Alrewas; in the Blithe throughout its course; in the Tame, Perry Barr; Fazley; Tamworth; canal, Milford; Gailey. (4) In the Severn, Arley; canal near Trescott.

Var. *Bachii* (Wirgt.). (4) In the Severn, Seckley, *Fraser.*

Var. *pseudo-fluitans* Bab., Hiern. (3) In the Trent, Armitage, *Reader*; stream near Harbourne. (4) Severn near Arley.

R. trichophyllus Chaix. (3) Brook near Wergs, *Fraser.* (4) Canal near Shelmore Wood.

R. Drouetii Godr. (3) Pool, Little Bosses, Stonnall; pool near Codsall. (4) Small pool, Oulton, near Gnosall.

b. *Godroni* Gren. (3) Wrottesley, *Fraser.*

R. peltatus, Schrank. (2) Rudyard Reservoir, *Painter.* (3) Knypersley Reservoir, *Painter*; Rough Hill, Wolverhampton.

b. *truncatus* Hiern. (3) Hopton Pools, Ingestre. (4) Pool, Oulton, near Gnosall.

c. *floribundus* Bab. (3) Hopton Pool, near Ingestre. (4) Oulton.

R. Lenormandi F. Schultz. (1) Near Flash. (2) Morridge Top, near Leek; near Ramshorn. (3) Knypersley Park, *Painter*; Chartley, *Brown*, 234; Norton Bog, *Fraser*; near Stone, *Bostock*; Great Barr; Queslet. (4) Bishops Wood, *N. S. S. Rep.* 1891; Oulton, near Gnosall.

R. hederaceus L. Frequent.

R. sceleratus L. Frequent.

R. Flammula L. Common.

Var. β. (1) At Belmont, *Garn.* 381.

R. Lingua L. Local. (3) Kingstone, Pool! *Stokes*, *With.* 618; High Onn; Eccleshall! *Garn.* 381; in the parish of Church-Eaton, *Shaw*, 112; near Stafford, *Douglas.* (4) In a ditch, north side of Aqualate! *Garn.* 381: Norbury Big Moss; Shelmore Wood; marshy field, Oulton.

R. auricomus L. (2) Ilam! *Fraser*; near Alstonfield. (3) Near Stafford, *Douglas*; Doxey, *Moore*; near Walsall; Sandwell. (4) Baggeridge Wood! *Fraser*; Weston-under-Lizard; Blymhill, *Shaw*, 112; Arley.

R. acris L. Common, meadows and waysides, *Garn.* 382.

R. repens L. Common, *Garn.* 382.

R. bulbosus L. Common in fields. (3) Double-flowered form in Burton meadows, *Garn.* 381.

R. sardous Crantz. *R. hirsutus* Curt. (3) Cornfields, Stretton, *Brown*, 234; Newcastle; Stafford! Burton, *Garn.* 382; Dippers, near Codsall, *Fraser*! (4) High Offley; Tettenhall Wood; Perton.

R. parviflorus L. (2) Tutbury, *Garn.* 382. (3) Near Stone, *Garn.*; cornfield by the Outwood Hill, *Brown*, 234; near Four Ashes, *J. Power*; Codsall; Wrottesley. (4) Near Enville, *J. Power*; Blymhill, *Shaw*, 112.

R. arvensis L. (3) Horninglow; Tatenhill! *Brown*, 234; Kings Bromley! *Moore*; Armitage, *Reader*; near Langley; Walsall; Great Barr. (4) Trysull.

R. Ficaria L. Ditches, &c., common.

Caltha palustris L. Canals! pools, &c., common.

Var. b. *Guerangerii* Boreau. Rare (3) near Alrewas.

Trollius europæus L. (2) Longnor, near Throwley, *Garn.* 382; woods at Belmont, *Shaw*, 114.

Helleborus viridis L. Rare. (1) Biddulph Castle, *Garn.*; not there now, *Painter*. (2) By the Manyfold under Castern; by the Dove below Thorpe, *Garn.* 380. (3) Shady spots at Braunston, *Brown*, 234.

H. FŒTIDUS L. (2) Moorlands, Belmont Woods, *Shaw*.

ERANTHIS HYEMALIS Salis. Naturalized, Cotton Hall, and at Vicarage Grounds, Stappenhall, *Brown*, 234.

Aquilegia vulgaris L. (3) Meadow north of Yoxall; Ashley Heath, *Garn.* 380; Needwood Forest, *Shaw*, ii. 6; at Cable Park and at Foremark, *Brown*, 235. (4) Bishop's Wood, *N. S. S. Rep.* 91; Seckley Wood; near Arley.

DELPHINIUM AJACIS Reichb. Alien. Needwood Forest, *Hewgill*, *Garn.* 380.

ACONITUM NAPELLUS L. (2) Banks of Churnet two miles below Cheddleton, *Garn.* 380.

BERBERIDEÆ.

Berberis vulgaris L. (2) Really wild in the valley of the Hamps below Waterhouses! *Garn.* 363. (3) Near Knypersley

Hall, *Painter*; Branstone, *Brown*, 234; abundant, Colton; near Colwich; near Great Haywood; Farley; Kings Vale, near Barr Beacon. (4) Trysull Dingle, abundant, 1898.

NYMPHÆACEÆ.

Nymphæa lutea L. (2) Manyfold, Ilam. (3) Trent at Stoke, *Garn.* 380; Knypersley Hall, *Painter*; near Lichfield; Milford; Sandwell; frequent in the Blithe; river Sowe near Stafford; Black Brook, near Shenstone. (4) Aqualate Mere! *Shaw*, 110; Dimmings Dale, near Trysull, &c.

Castalia speciosa Salisb. (1) Boggy pit near Betley, *Shaw*, 101. (2) Alton! *Shaw*. (3) Barlaston, *Shaw*; Trent near Burton! *Garn.* 380; Trent near Walton! Lily Pits, Branston, *Brown*, 238; near Stafford! *Douglas*; pool by railway, Milford, *Reader*. (4) Aqualate Meer! *Shaw*, 101; Snowdon Pool, Patshull, *Garn.* 380.

PAPAVERACEÆ.

PAPAVER SOMNIFERUM L. (2) Tutbury Castle, *Garn.* 379. (3) Kingswood Common, Codsall.

P. Rhœas L. Rare in the north of the county, *Garn.* 379. (3) Near Stafford, *Douglas*; Great Barr, Oscott, &c. (4) Wightwick; Lower Penn; Trysull.

Var. *strigosum* Boenn. (4) Near Wolverhampton, *Fraser*.

P. dubium L. Common.

Var. *Lecoqii* Lam. (2) Mill Dale, Alstonfield, *Purchas*!

P. Argemone L. Frequent.

Chelidonium majus L. Frequent near villages throughout the county.

FUMARIACEÆ.

NECKERA LUTEA Scop. Frequent on walls near houses, *Garn.* 397. (3) Naturalized on wall, Walton Hall, *Brown*, 236; Salt.

N. BULBOSA N. E. Brown. Alien. (3) Grove near the Rectory, Muxton, *Shaw*, 392; at Perry Hall, in a meadow near the house and river; at Blithfield House, *Bagot*, *With.* 606. (4) Near the Rectory, Muccleston; *Shaw*, 105; Trysull.

N. claviculata N. E. Br. (1) Craddocks Moss, *Fraser*. (2) Rudyard Reservoir, *Painter*. (3) Hawkesyard Park, *Reader*; near Stafford, *Douglas*; Fryer Park and near Walsall. (4) Weston-under-Lizard, *Shaw*, 105.

Fumaria capreolata L. Frequent? *Garn.*; Shobnall, *Brown*, 396. Probably a rampant form of *F. officinalis* J. E. B.

F. muralis Sonder. (3) Hawkesyard Priory, *Reader*!

F. officinalis L. Common.

F. VAILLANTII Lois.? (2) Tutbury Castle, *Brown*, 396.

CRUCIFERÆ.

CHEIRANTHUS CHEIRI L. (3) Burton Abbey walls, *Garn.* 398; ruins of Rugeley Old Church, *Garn.* 390; (on the ruins of Dudley Castle!) *Garn.* 390.

Nasturtium officinale R. Br. Common! *Garn.* 389.

N. sylvestre R. Br. (3) Tamworth; Burton, *Garn.* 389; Wetmore, *Brown*, 236. (4) Blymhill, *Shaw*, 114; Arley.

N. palustre DC. (2) Rudyard Reservoir, *Painter*; Calton; Dimmings Dale. (3) Stoke, *Garn.* 389; Knypersley, *Painter*; Kings Bromley; Shirleywich, Stowe, Pottall, &c. (4) Blymhill, *Shaw*, 114; Penn, Sedgeley, Perton, Arley, &c.

N. amphibium R. Br. (2) Alton; Burton-on-Trent, *Shaw*, 114; near Stoke! Weston-on-Trent! Barton; Tamworth! *Garn.* 389; Armitage! *Reader*; Kingston Pool; Hamstead, &c. (4) Perton Pool, Oulton, Aqualate, &c.

Barbarea vulgaris R. Br. Common.

B. PRÆCOX R. Br. (3) Near Stoke, introduced, *Garn.* 389; garden weed, Calke, *Brown*, 236.

Arabis hirsuta Scop. On limestone everywhere? (2) Tutbury, on sandstone, *Garn.* 389; Manyfold and Welton Valleys; Ecton; Dovedale.

A. perfoliata Lam. (3) Lichfield; Tamworth; Burton, *Garn.* 389; hedgebanks, Woodville, *Brown*, 236. (4) Wetton-under-Lizard; Himley Park wall; between Kinver and Enville! *Shaw*, 114; Patshull, near Pattingham.

Cardamine amara L. (1) Congleton Edge, *Painter*. (2) Leek, *Dr. Parsons*; near Rudyard Reservoir, *Painter*. (3) Trent-side, Burton Meadows, *Brown*, 237; Knypersley Park, *Painter*; Hawkesyard, *Reader*; Blithfield Park; Blithford; near Stafford; Hamstead; Great Barr; Shenstone, &c. (4) Blymhill, *Shaw*, 100; Trysull; Compton.

C. pratense L. Common. (4) With double flowers at Trysull, *Fraser*.

C. hirsuta L. Very common.

C. flexuosa With. (2) Dimmings Dale, Alton. (3) Abundant at Knypersley, *Painter*. (4) Blymhill Marsh, *Shaw*, 100. Abundant throughout the county.

C. impatiens L. (2) Dovedale, on limestone shales, *Shaw*, 100; Hamps Valley; Ecton Hill, *Garn.* 389; Manyfold Valley; Ilam. (3) Between Lichfield and Freeford, *J. Power*; Barrow Hill; Rowley Regis; Sedgeley, *Shaw*, ii. 26; Whittington Common; Upper Arley.

C. bulbifera R. Br. (3) Grove by the churchyard, Blithfield; Pendeford; Needwood Forest, *Garn.* 388.

ALYSSUM CALYCINUM L. (4) Lower Penn, *Fraser*.

Draba muralis L. (2) Manyfold Valley; Ecton Tor, *Fraser*; Ilam; Dovedale. (3) Walls of Lichfield Close, *Shaw*, 100.

D. incana L. (2) Limestone rocks by Thor's Cave, *Garn.* 388; Dovedale.

Erophila vulgaris DC. (1) On the top of Mow Cop, *Garn.* 388. (2) Dovedale. (3) Castle Hill; Stafford, *Moore*; with subfalcate pods, Hawkesyard, *Reader*; Ingestre; Tixall. (4) Himley; Trysull.

Cochlearia Armoracia L. (3) Near Knypersley Hall, "remains," *Painter*; Wolverhampton, *Fraser*; by the Trent, Armitage, *Reader*; Tixall Heath; Ingestre; Blithbury; Stone; Rugeley; Great Barr. (4) Perton; Himley.

Hesperis matronalis L. (2) Near Cheadle, *Carter*, 1839. (4) Wightwick, *Fraser*.

Sisymbrium officinale Scop. Common.

S. Thalianum J. Gay. Common.

S. Sophia L. (2) Tutbury Castle, *Shaw*, 114; Cotonfield, *Garn.* 391. (3) Burton, *Garn.* 391; Walton Lane Bridge, *Brown*, 237; between Hanging Bridge and Matchfield, *Shaw*, ii. 7; near Stafford, *Douglas*.

S. Alliaria Scop. Common.

Erysimum cheiranthoides L. (2) Roadside near Mayfield, *Garn.* 391. (3) Fradley Heath, *J. Power*; between Hanging Bridge and Matchfield, *Shaw*, ii. 7; railway banks near Wolverhampton; Wergs, *Fraser*; Kings Bromley, *Moore*. (4) Caledonia, near Stourbridge, *Garn.* 390; Trysull.

Camelina sativa Crantz. (2) Several times in Cheddleton Park, *Garn.* 388. (4) Blymhill, *Shaw*; Orton, *Fraser*; Wombourne; field at Perton.

Brassica Napus L. Common in cornfields? *Garn.* 390.

B. Rutabaga DC. Common on cultivated land.

B. Rapa L. Frequent remains.

b. *sylvestris* H. C. Wats. (2) Horton, *Painter*.

B. sinapioides Roth. (2) Tutbury, *Shaw*, 100. (3) Common about Stafford; Barton, *Garn.* 390; road from Knypersley to Leek, *Painter*; Hardwick; Sandwell. (4) Upper Arley.

B. Sinapistrum Boiss. Very common, *Garn.* 390.

B. alba Boiss. (3) Field by Barnhurst Brook, *Fraser*; Sandwell; near West Bromwich; Hardwick Heath; frequent in the northern portion of county.

Diplotaxis tenuifolia DC. (2) Lichfield Close, *Ray*, Syn. 297, 772. (4) Kinver Edge.

Bursa Bursa-pastoris Weber. Very common.

Coronopus didymus Sm. (3) Yoxall Lodge, *C. Babington*; Shobnall, *Brown*, 239. (4) Enville, *Fraser*.

C. Ruellii All. (2) Uttoxeter! *Garn.* 390. (3) Between Stafford and Kingston Pool! *Garn.* (4) Near Cradley Forge, *Garn.*

Lepidium ruderale L. (3) Roadside from Kings Bromley to Sudbury.

L. sativum L. Codsall, *Fraser*.

L. campestre R. Br. (2) Near Alton. (3) Kings Bromley! *Moore*; Shobnall; Needwood Forest, *Brown*, 238; near Haughton. (4) Trysull; Upper Arley, frequent.

L. hirtum Sm. (1) Leycett; Betley, *Garn.* 388. (3) Tettensor; Swinnerton! *Garn.* 388; Shobnall, *Brown*, 238; Whitaker, *Fraser*.

(4) Maer; Willowbridge, *Garn.* 388; Lower Penn, *Fraser*; near Baggeridge Wood; near Chase Pool Lodge; Smestow; Swindon.

Thlaspi arvense L. (3) Stone, *Ray*, Syn. 305; Burton; Barton-under-Needwood, *Brown*, 238; Kings Bromley, *Moore*; near Colwich, abundant; (4) Trysull, *Fraser*; Enville; near Chase Pool Lodge; Smestow; Swindon.

IBERIS AMARA L. (2) Near Leek, *Rev. W. Wood*, Bot. Guide; by the roadside on a common between Cheadle and Oakamore, *Shaw*, 113.

Teesdalia nudicaulis R. Br. (1) Betley, *Garn.* 388. (3) Shooters Hill; near Tettensor; Swinnerton; Lichfield! *Garn.*; Catholme Gate, *Brown*, 238; on a sandy bank in lane leading from Greenhill Church to Freeford; also on Burton Hill, *J. Power*; Perry Barr Common, *Luxford*, 1838; roadside near Barr Wood. (4) Blymhill, *Garn.* 388; Kinver.

Hutchinsia petræa R. Br. (2) Berresford; Wetton Mill; Wever Hill; Beeston Tor; Dovedale, *Garn.* 388.

Raphanus Raphanistrum L. Frequent in cornfields, *Garn.* 391. (3) Garden weed near Stafford, *Moore*; Rugeley, *Reader*; Cannock, *Fraser*; Four Ashes; near West Bromwich; near Tettenhall.

RESEDACEÆ.

Reseda lutea L. (3) Hayhead. (4) Between Wren's Nest and Tipton; Wren's Nest.

R. Luteola L. (1) Leycett; Heyley Castle, *Garn.* 374. (2) Tutbury Castle! *Brown*, 239. (3) Between Forton and Sutton, *Shaw*, 112; Dudley Castle, *Shaw*, ii. 7; Burton, *Brown*, 239; near Stafford, *Garn.* 374; Hayhead. (4) Barrow Hill, *Garn.*; Himley Wood; Gornal; Hinksford; Coldridge Wood; Stewponey.

CISTINEÆ.

Helianthemum Chamæcistus Mill. (2) Moorlands; Thor's Cave, *Pitt Shaw*, 102; valleys of Manyfold and Dove, *Fraser*; Wever Hill! *Brown*, 239; Longnor, *N. S. S. Rep.* 91.

VIOLARIEÆ.

Viola palustris L. (2) Near Coton and Whiston, *Carter*, 1839; Morridge Top, near Leek; Dimmings Dale; Alton. (3) Near Knypersley Pool, *Painter*; Norton Bog, *Fraser*; Hawkesyard Park, *Reader*; Sherbrook Valley; near Cannock Terrace and Chase Town; Trickley Coppice. (4) Norbury Big Moss.

V. odorata L. (1) Heyley Castle; Betley; Croxden, *Garn.* 357; Rolleston, *Brown*, 239; near Cheadle, *Carter*, 1839; Alton Hanbury; Draycote-in-Clay. (3) On the coal strata south of Wolverhampton; road from Knypersley to Leek, *Painter*; Wergs, Tettenhall, Oaken, *Fraser*; near Stafford, *Moore*; Wichnor Lane to Park, *Brown*, 239; Blithbury; Chartley. (4) Blymhill, Weston-under-Lizard, *Shaw*, 115; Trescott, Trysull, *Fraser*; Arley; Coldridge Wood.

Var. *alba* B. (2) Small Park, Rolleston, *Brown*, 239; Seabridge; Blithe Marsh, *Garn.* 356; Milwich. (4) Penn; Trysull.

V. hirta L. (2) Dovedale, *Purt.* i. 744; Ecton and Wetton Valleys, *Garn.* 355; near Beeston Tor; Manyfold Valley, *Fraser.*

V. silvestris Reichenb. (2) Draycott-in-Clay; near Uttoxeter. (3) Hoare Cross, abundant. (4) Shatterford; Lower Gornal; Arley and Coldridge Woods.

V. Riviniana Reichenb. Banks, &c., frequent.

V. ericetorum Schrad. *V. flavicornis* Garn. (2) Draycote, *Garn.* 356. (3) Cannock Chase! *Garn.* 356; near Stafford, *Douglas*; Sherbrook Valley. (4) Near Enville! *Fraser*; Kinver Edge.

V. tricolor L. (2) Alton, *Dr. Parsons.* (3) Between Rugeley and Wolseley Bridge! *J. Power*; Biddulph, *Painter*; Tettenhall! *Fraser*; Tixall Heath; near Kingston Pool; wall, lane near Shenstone. (4) Arley.

V. arvensis Murr. Common, *Garn.* 356.

V. lutea Huds. (1) Highlands, Swithamley. (2) Butterton; Wetton! Alstonfield! Throwley; Wever Hill! Grindon Longnor; Leek, *Garn.* 356; Warslow.

Var. *amœna* (Symons). Dovedale, *Garn.* 356.

POLYGALEÆ.

Polygala vulgaris L. (2) Star Wood, Oakamore. (3) Kings Bromley; Fradley, *Moore.* (4) Sedgeley Old Quarry, *Fraser*; Oulton, near Gnosall.

P. serpyllacea Weihe. (1) Hilly land, Swithamley. (2) Wever Hill. (3) Biddulph road to Knypersley, *Painter*; Whitmore, *Fraser*; Cannock Chase; Sherbrook Valley; Norton Bog. (4) Seckley Wood; Arley.

CARYOPHYLLEÆ.

Dianthus Armeria L. (3) Lichfield, *Miss Jackson*; Mony Hills, near Yoxall, *Shaw*, ii. 11.

D. deltoides L. (2) Longnor, *N. S. S. Rep.* 91, 4; Trysull and Swindon, *Wainwright, Shaw*, ii. 6.

SAPONARIA OFFICINALIS L. (3) North-western extremity of Hamstall-Ridware, *Riley, Shaw*, ii. 8; roadside near Hixon; Marvesyn Ridware; Hednesford; Burton, *Garn.* 370; near Croxall, *J. Power.* (4) Blymhill, *Shaw*, 212; Upper Arley.

Silene Cucubalus Wibel. (2) Dimmings Dale; Alton; Calton. (3) Hawkesyard Park, *Reader*; Colwich; Shirleywich; Weston-on-Trent, &c. (4) Hinksford; Trysull.

S. anglica L. (3) Railway cutting, Streetley. (4) Cornfield at Upper Arley, *Garn.* 371; Enville, *Fraser.*

S. nutans L. (2) Dove Dale! *Bree, Purt.* i. 733; about Thor's Cave, *Garn.* 371; Alstonfield.

S. noctiflora L. (3) Near Lichfield, *Miss Jackson, Garn.* 370; abundant, Breach Farm, *Brown*, 240.

Lychnis alba Mill. Frequent.

L. dioica L. Common.

L. Flos-cuculi L. Common.

L. Githago Lam. (3) Arable land near Wickerstone Rocks, *Painter*; King's Bromley, *Moore*; Weston-on-Trent; Great Barr; Hamstead.

Cerastium quaternellum Fenzl. (3) Sandy commons, Barlaston; Lichfield, *Garn.* 373; Blackbrook Reservoir, *Brown*, 242; Sherbrook and Abraham Valleys, Cannock Chase. (4) Pond Green, Seckley, *Fraser.*

C. tetrandrum Curtis. (3) Stafford, *Mr. Spark.*

C. semidecandrum L. (3) Aldershaw, Lichfield, *J. Power*; Brown Hills, Highgate, *Fraser*; Breedon, *Brown*, 242. (4) Trescott.

C. glomerata Thuill. Common! *Garn.* 373.

C. triviale Link. Common, *Garn.*

C. arvense L. Rare, occasionally on limestone, *Garn.* 373. (4) Kinver Edge.

Stellaria aquatica Scop. (2) Uttoxeter; Marchington. (3) Stoke, *Garn.* 373; Kingston Pool, *Fraser*; Stretton and Braunston, *Brown*, 242; Chartley; Stowe; Weston-on-Trent; Sandwell, &c. (4) Compton; Stewponey; Stourton.

S. nemorum L. (2) Abundant by the Churnet, Oakamore.

S. media With. Very common.

b. *neglectum* Weihe. (2) Draycote-in-Clay; Uttoxeter; Marchington Woodlands. (3) Elmhurst; Colton.

S. Holostea L. Very common.

S. palustre Retz. Local. (3) Marvesyn Ridware, *J. Power*; Walton Lane; Catholme, *Rev. W. Hind.* (4) Compton, *Fraser*; Wightwick; Kinver Edge.

S. graminea L. Common.

S. uliginosa Murr. Frequent.

Arenaria verna L. (2) Dovedale; Ecton Hill, *Garn.* 371.

A. tenuifolia L. (2) Wever Hill! *Garn.* 371.

A. trinervia L. Common.

A. serpyllifolia L. Walls, frequent.

Var. *leptoclados* Guss. (3) Near Kingswood Common, Codsall. (4) Old quarry, Coldrick Wood; Arley Wood.

Sagina apetala L. (2) Wall near Rudyard railway, *Painter*; near Aldridge; Little Aston. (4) Walls, Arley.

S. ciliata Fr. (3) Brereton, *Reader.* (4) Seckley Dingle, *Fraser*; Kinver Edge.

S. procumbens L. Common.

S. subulata Presl. (2) Wever Hill. (3) Tettensor, *Garn.* 373.

S. nodosa Fenzl. (2) Oakamore, *Garn.*; near Endon, *N. S. S. Rep.* 93. (3) Cannock Chase, *Garn.* 373; Sherbrook Valley. (4) Offley Hay, *Garn.*

Spergula arvense L.

a. *vulgaris* Boenn. (1) Biddulph, *Painter*. (3) Stafford, *Moore*; Milwich; frequent in county.

b. *sativa* Boenn. (3) Sandon; Great Barr; Little Aston, &c. (4) Arley. Frequent, but not sufficiently studied.

Buda rubra Dum. Frequent—footways, heaths, &c.

B. marina Dum. (3) Salt-marsh, near Kingston Pool; Rickerscote, *Garn.* 372; Shirleywich, *Stokes*, *With.* 414.

PORTULACEÆ.

CLAYTONIA SIBIRICA L. (3) Naturalized. (3) Penkridge, *Garn.*; grounds, Knypersley Hall; Greenway Bank, *Painter*.

C. PERFOLIATA Donn. (3) Abundant in field at Perry.

Montia fontana L.

α. *repens* Pers. (2) Dovedale. (3) Near Walsall; Cannock Chase; Hednesford; Norton Bog; Sherbrook Valley. (4) Himley; Trysull.

β. *erecta* Pers. (2) Harracks Mill, Horton, *Painter*. (3) Cannock Chase; Sherbrook. (4) Himley; Trysull.

ELATINEÆ.

Elatine Hydropiper L. Abundant, Pottall Reservoir, 1895.

HYPERICINEÆ.

Hypericum Androsæmum L. (3) Needwood Forest, *Shaw*, ii. 7; Pendeford, *Pitt*, *Shaw*, 105; Broadwell Wood; Woodroffe Cliff, Hopwas, Leycett, *Garn.* 396; Seckley; Enville.

H. perforatum L. Frequent.

b. *angustifolium* Gaud. (4) Coldridge Wood; Arley.

H. dubium Leers. (3) Burton, *Garn.* 396; Stretton Grove, *Shaw*, 105; Rugeley, *Reader*; Anglesea Coppice, near Chartley; Hamstead canal-bank. (4) Wren's Nest, *Fraser*.

H. quadratum Stokes. (3) Moddershall, near Stone, *With.* 867; near Knypersley, *Painter*; Kings Bromley, *Moore*; Kingston Pool; Great Barr, &c. (4) Compton; Trysull! *Fraser*.

H. humifusum L. (1) Biddulph Moor, and lane to Gillow Hill, *Painter*. (2) Wever Hill; Ramshorn. (3) Lask Edge, *Painter*; Codsall, *Fraser*; Maer Village, *N. S. S. Rep.* 88; Hawkesyard, *Reader*; Ingestre; Fradley. (4) Blymhill, *Shaw*, 105. (4) Compton; Penn Fields! *Fraser*; Coldridge Wood; Seckley.

H. pulchrum L. Common on heaths! *Garn.* 396. Frequent throughout the county.

H. hirsutum L. (2) Tutbury, *Shaw*; Rocester! *Fraser*. (3) Bury Ring, Stafford, *Moore*; woods near Hanbury. (4) Marston, *Fraser*.

H. montanum L. (3) Burton, *Garn.* 396.

H. elodes Huds. In all our bogs and marshes? *Garn.* 396. (3) Needwood Forest, *Shaw*, ii. 7; Chartley Moss! *Brown*, 243. (4) Weston-under-Lizard, *Shaw*, 105.

MALVACEÆ.

Malva moschata L. (2) Near Sudbury. (3) Needwood Forest! Blakelaw! *Brown*, 242; Kings Bromley, *Moore*; Billbrook! *Fraser*; Weston-on-Trent; Blithbury; Tixall; Chartley; Hopwas Wood, &c. (4) Blymhill, *Shaw*.

M. sylvestris L. (3) Stafford, *Moore*; Hamstall Ridware; Hixon, Drointon, &c. (4) Trysull.

M. rotundifolia L. (1) Biddulph, *Painter*. (2) Uttoxeter. (3) Near Brewood, *Shaw*, 107; Mavesyn Ridware, *Reader*; Orgreaves, *Moore*; near Stafford, *Douglas*; Drointon; Hixon; Queslet; Perry Barr; Milwich, &c. (4) Trysull! *Fraser*.

TILIACEÆ.

TILIA VULGARIS Hayne. In every district throughout the county; planted.

T. cordata Mill. (3) Frequent in Needwood Forest! *Garn.* 379. (4) Oaken, *Fraser*.

LINEÆ.

Radiola linoides Roth. (3) Barlaston Common. (4) Offley Hay, *Garn.* 350.

Linum catharticum L. Common in the county.

L. perenne L. Casual. (3) Aldridge. (4) Whittington Heath, *Fraser*.

L. angustifolium L. (3) Burton (Mr. Brown), *Garn.* 362.

L. USITATISSIMUM L. Casual. (1) Brome; field between Betley and Madeley, *Garn.* 362. (3) Once near Stoke, *Garn.*; Codsall, *Fraser*. (4) Blymhill, *Garn.*

GERANIACEÆ.

GERANIUM PHÆUM L. Alien. (3) Yoxall Lodge, *J. Power*. (4) Rowley Hills towards Cradley, *Garn.* 391.

G. sylvaticum L. (3) Burton, *Garn.* 391, doubtful.

G. pratense L. (2) Tutbury, *Fraser*; near Cheadle, *Carter*, 1839; Wever Hill. (3) Stoke! &c., *Garn.* 391; Stone! Croxden Abbey, *Shaw*, 105; Stafford! *Moore*; Milton; Barlaston. (4) Upper Arley.

A variety with nearly white flowers, Ilam, *Garn.* 391.

G. pyrenaicum Burm. (3) Walton, near Stone; Stramshall; Lichfield; Barton-under-Needwood, *Garn.* 391; Hill Ridware, *Reader*. (4) Enville, *Garn.* 391.

G. molle L. Common.

G. pusillum Burm. (2) Near Cheadle, *Carter*, 1839. (3) Shobnall, *Brown*, 249; Hawkesyard, *Reader*. (4) Trescott, *Fraser*.

Var. β. (3) Roadsides, Burton, *Garn.* 392.

G. dissectum L. Common! *Garn.* 392.

G. columbinum L. (2) Wetton; Thor's Cave; Beeston Tor; Dovedale! *Garn.* 392; Wever Hill. (3) Near the entrance to Barr Beacon from Birmingham, *With.* 796; Lichfield, *Garn.* 392; Barrow Hill, *Shaw*, ii. 7. (4) Trysull.

G. lucidum L. (2) Longnor, *N. S. S. Rep.* 88; Valleys of the Manyfold and Dove! *Fraser;* near Cheadle, *Carter*, 1839; Alton Towers. (3) Coppenhall, near Stafford, *Moore*; Croxden Abbey, *Shaw*, 105; near Walsall; near Aldridge. (4) Stone walls, Rowley, *Shaw*, ii. 7.

G. Robertianum L. Common. (1) With white flowers at Madeley, *Garn.* 391.

Erodium cicutarium L'Hérit. (2) Dovedale, *Brown*, 244; Wever Hill. (3) Hopton! *Moore*; Hawkesyard, *Reader*; betwixt Lichfield and Freeford, *J. Power*; lane near Walsall; Hayhead. (4) Blymhill in the Pye fields, *Shaw*, 105; Wightwick; Bratch, *Fraser*; Trysull; Kinver Edge.

E. MOSCHATUM L'Hérit. Rare. (4) Bishops Wood, *N. S. S. Rep.* 1891; Rowley, *Shaw*, ii. 7; Dudley, *Garn.* 391.

E. maritimum L'Hérit. (3) Lichfield, *Garn.* 391; near Rugeley, *Dr. Parsons.* (4) Wombourne; Orton, *Shaw*, ii. 6; Kinver! *Purt.* i. 317; Seckley Wood; High Heath, Enville, *Fraser.*

Oxalis Acetosella L. Frequent in woods. (2) Dripping rocks, Alton Castle, *Shaw*, 110; Dimmings Dale; Marchington. (3) Stafford, *Moore*; Milwich, Great Barr, Handsworth, &c. (4) Seckley Wood, Arley Wood, &c.

Var. *subpurpurascens* DC. (1) Lion's Paw Wood, *Painter.*

ILICINEÆ.

Ilex Aquifolium L. Frequent.

CELASTRINEÆ.

Euonymus europæus L. (2) Plentiful in Dovedale! and Wetton Valley, *Garn.* 355. (3) Drakeford, *Brown*, 245; Stretton, *Shaw*, 105. (4) North side of Aqualate, *Fraser.*

RHAMNACEÆ.

Rhamnus catharticus L. (2) Dovedale, &c., *Garn.* 355; near Cheadle, *Carter*, 1839. (3) Kings Bromley, *Moore*; Walton, *Brown*, 245; Codsall! *Fraser*; Upper Stonnall. (4) Near the Bratch between Wombourne and Trysull! *Fraser.*

R. Frangula L. (1) Craddocks Moss, *Fraser.* (2) Bagnall; Oakamoor. (3) Wet thickets, Chartley Moss! Maer! *Garn.* 355; Hedges, Pendeford, *With.* 254; Dippers Codsall, *Fraser*; Kingston Pool; Boulton's Park; Handsworth Wood. (4) Willow Bridge, *Shaw*, 112; wood at Smethwick, *Stokes, With.* 254.

SAPINDACEÆ.

ACER PSEUDO-PLATANUS L. Frequent.

A. campestris L. Frequent throughout the county.

LEGUMINOSÆ.

Genista anglica L. (2) Archford Moor; Grendon Moor, *Garn.* 393; near Cheadle, *Carter*, 1839; Cheddleton, *N. S. S. Rep.* 93. (3) Needwood Forest, *Brown*, 245; Fenton Park; Lichfield, *Garn.* 393. (4) Blymhill, *Shaw*, 105.

G. tinctoria L. (2) Tutbury, *Brown*, 248; Cheadle, *Carter*, 1839; Ramshorn. (3) Near Stafford, *Douglas*; Drointon; Anglesea Coppice; Hixon. (4) Seckley, *Fraser*; Oulton.

Ulex europæus L. Common! *Garn.* 392.

U. Gallii Planch. (2) Dovedale! *Garn.* 393. (3) Near Lichfield! Needwood! *Garn.*; near Stafford, *Douglas*; Hawkesyard, *Reader*; road from Biddulph Grange to Knypersley Hall, *Painter*; Sandon; lanes about Stonnall; Little Aston; Barr Beacon. (4) Kinver! *Garn.*; near Himley; Trysull; Chase Pool.

Cytisus scoparius Link. Frequent.

Ononis repens L. Frequent! *Garn.* 393.

O. spinosa L. Common? *Garn.* 393. (2) Rolleston, *Brown*, 246. I have not seen this in Staffordshire.

MEDICAGO SATIVA L. Alien. (2) Cheadle, *Garn.* 395. (3) Burton, *Garn.*; occasionally on the Trent Valley Railway; Barr; Hamstead, Sandwell; Little Aston. (4) Dudley Castle, *Garn.*; Kinver! *Fraser*.

M. lupulina L. Frequent! *Garn.* 395.

M. denticulata Willd. (3) Wightwick, *Fraser*.

[M. FALCATA L. About Stafford; Yarlet Hill, *Garn.* 395; probably an error.]

Melilotus officinalis Lam. (2) Tutbury, *Dickinson in Shaw*, 114; Yarlet Hill; Uttoxeter, *Garn.* 394; near Cheddleton; near Stockton Brook; Milton; Battersley Junction; Fenton Moor. (3) Between Chartley and Longdon, *Shaw*, ii. 7; Stoke, *Garn.* 394; about Stafford Castle, *Fraser*; near Stafford, *Douglas*; railway banks near Walsall.

M. ALBA Desr. (3) Waste ground, Rugeley! *Reader*. (4) Wightwick, *Fraser*.

M. arvensis Wallr. (3) Near Albion Station, *Fraser*; Tettenhall.

M. INDICA All. (3) Near Wolverhampton, *Fraser*.

Trifolium pratense L. Common! *Garn.*

T. medium L. (1) Near Biddulph Grange, *Painter*. (3) Brotley and Kingston Park, *Brown*, 246; Armitage, *Reader*; Hydas Lee, *Moore*; Hamstead; Witton. (4) Blymhill, *Shaw*, 114; Wren's Nest, &c.

[T. OCHROLEUCON Huds.? (3) Goscott, near Walsall? *Shaw*.]

T. INCARNATUM L. Not British, but occasionally among corn. (3) Barlaston, *Garn.* 394.

T. arvense L. (2) Betley; Alton. (3) Lichfield, *Garn.* 395; Cannock Station; Wichnor, *Fraser*; railway slopes, Branstone, *Brown*, 216; Weeping Cross towards Stafford, *Moore*; near Stafford, *Douglas*; Salt; lanes near Witton. (4) Kinver! *Garn.*

T. striatum L. (3) Fields about Stafford, *Shaw*, 114; near Shirleywich; Lichfield, *Garn.* 395; dry banks, Hawkesyard, *Reader*.

T. HYBRIDUM L. (1) Cultivated ground, Biddulph, *Painter*; field-borders, occasionally. (2) Alton. (3) Near Colwich. (4) Arley.

T. repens L. Common.

T. procumbens L. Frequent.

T. dubium Sibth. Common.

T. filiforme L. Rare. (3) Barton, *Brown*, 247. (4) Enville! *Fraser*.

Anthyllis Vulneraria L. Common on limestone? *Garn.* 393. (2) Dovedale! Valley of Manyfold, *Fraser*; Longnor, *N. S. S. Rep.* 93.

Lotus corniculatus L. Common! *Garn.* 395.

L. tenuis Waldst. & Kit. (2) Dovedale, *Garn.* 395. (3) Hawkesyard, *Reader*. (4) Willow Bridge, *Garn.*; Oulton, near Gnosall.

L. uliginosus Schkuhr. Frequent in moist places, *Garn.*! 395.

Astragalus glycyphyllus L. (3) In a field between King's Bromley and the Trent, *Shaw*, ii. 7; in the bushes at the top of Coton Field, Stafford, *Garn.* 394; between Stafford and Penkridge, *Shaw*, 106; near Stafford, *Douglas*. (4) Aqualate, both sides! *Fraser*.

Ornithopus perpusillus L. (3) Trentham! *Garn.* 394; Weeping Cross, *Moore*; Wichnor! *Brown*; near Stafford, *Douglas*; near Barr Beacon; Aldridge; Stonnall; Pottall Reservoir; Great Barr; Little Aston; Streetley. (4) Kinver! *Purt.* i. 350; Orton; Whitaker Heath; Chase Pool, Swindon.

Hippocrepis comosa L. Very rare. (2) On a rock in the Wetton Valley, *Garn.* 394.

Onobrychis viciæfolia Scop. Very rare. (3) Codsall, *Fraser*.

Vicia hirsuta Gray. Common! *Garn.* 394.

V. gemella Crantz. (2) Rolleston, *Brown*, 247. (3) Walton, *Brown*; near Drayton, Lichfield! Burton, *Garn.*; near Stafford! *Douglas*; near Kingston Pool; Tixall. (4) Trysull.

V. Cracca L. Common in hedges! *Garn.* 394.

V. sylvatica L. (1) Madeley Rectory, *Yates*. (2) Dovedale, *Garn.* 394; Wetton Valley, plentiful; *Fraser*. (3) About Stone and Oulton, frequently with white flowers; Tittensor; Moddershall; Tamworth, *Garn.* (4) Arley.

V. sepium L. Common.

V. sativa L. Frequent.

V. angustifolia L. Frequent.

β Bobartii Koch. (3) Pipe Marsh; near Chase Town; near Stafford. (4) Kinver! *Fraser*; Oulton, near Gnosall.

V. lathyroides L. (3) Near Stafford, *Douglas*. (4) Kinver Edge.

Lathyrus Aphaca L. (4) Whittington Heath, *Fraser*!

L. Nissolia L. (2) Woods at Belmont, *Pitt*, *With*. 618. (3) Barton-under-Needwood, *Garn*. 394; Coton Fields, Stafford, *Shaw*, 107.

L. sylvestris L. (3) Red Hill, Stone Park, *Foster*, *Shaw*, 107; Tattenhill, *Garn*. 394; Shobnall; Aston Quarry, *Brown*, 248.

L. pratensis L. Common.

L. montanus Bernh. (2) Wever Hill; Marchington. (3) Knypersley, *Painter*; near Walsall. (4) Trysull, *Fraser*; Seckley; Arley; Oulton, near Gnosall.
Var. *tenuifolius* Reich. (2) Wever Hill. (4) Seckley; Oulton, near Gnosall.

ROSACEÆ.

Prunus spinosa L. Common.

P. insititia Huds. (3) Trent Meadows, &c., *Garn*. 374; Langley, *Fraser*. (4) Near Arley.

P. Avium L. Frequent.

P. Cerasus L. "Frequently wild in woods," *Garn*. 374.

P. Padus L. (1) Biddulph Valley, *Painter*; Gillow Heath, abundant, *Moore*. (2) Dovedale, *Bree*, *Purt*. 725; Leek; Ramshorn. (3) Pendeford, *Pitt*, *With*. 446; near Chesterfield; Knowles, near Lichfield, *J. Power*; Tamworth; Little Aston.

SPIRÆA SALICIFOLIA L. Needwood, *Miss Jackson*; thickets on Cannock Chase, *Dashwood*, *Garn*. 376.

S. Ulmaria L. Common.

S. Filipendula L. (1) Gradbatch Hill, *Garn*. 376. (2) Wever Hill! *Garn*. (3) Railway embankment, Armitage, *Moore*; field near Barr Farm.

Rubus Idæus L. Frequent, (1) Flash. (2) Near Alton. (3) Clayton, with white fruit, *Garn*. 377; King's Bromley; Hanbury; Sandon; Stone, Salt, Shenstone, &c. (4) Arley Wood; Seckley; Trysull.

R. fissus Lindl. (1) Rushton Spencer, 1000 ft., *Painter*. (2) Lask Edge, *J. W. White*; Rudyard Reservoir, *Purchas*; Dimmings Dale, near Alton; Alton Towers. (3) Chartley Moss; Trickley Coppice; Handsworth Wood.

R. suberectus Anders. (3) Whitmore; Chartley Moss; Ravens Hill; Rugeley; near Streetley. (4) Cranmore Wood, *Fraser*.

R. plicatus W. & N. Biddulph district, *Painter*. (2) Rudyard district, *Painter*. (3) Wood by Streetley railway.

R. nitidus W. & N. var. *hamulosus* Lev. & Muell. (3) Roadside near Streetley railway-cutting.

R. carpinifolius W. & N. (1) Biddulph, *Painter*. (2) Rudyard Reservoir, *Painter*; Longnor, *Purchas*! (3) Ingestre; Tixall; Salt; Fradley; Kingston Pool; Cannock Chase; Stonnall; Hatherton; Streetley; near Walsall.

R. incurvatus Bab. (3) Hopton. (4) Lane by Smestow Mill, confirmed by *Rev. W. Moyle Rogers.*

R. Lindleianus Lees. Frequent. (1) Rushton, *Bailey*; near Flash. (2) Near Horton Church, *Painter*; Rushley, near Ilam, *Purchas.* (3) Mavesyn Ridware; Sandon; Milwich; Weston; Saresdon; Rugeley; Hopton; Drointon; Gailey, Hatherton; Codsall. (4) Pattingham, Baggeridge Wood.

R. erythrinus Genev. Very local. (3) Hatherton; near Little Aston; Aldridge Road, Perry Barr. (4) Himley.

R. rhamnifolius W. & N. (2) Rudyard Reservoir, *Painter*; Alton Common; Forest Banks, Marchington. (3) Kingston; Blithfield; Bagots Wood; Stonnall; Hints; Wall; Brown Hills; near Walsall; Tixall Heath. (4) Baggeridge Wood; Pattingham; Rainsford; Spittle Mill.

Var. *Bakeri* F. A. Lees. (3) Pottall; Hints; Drayton; Weeford. (4) Spittle Brook; Rainsford.

R. nemoralis P. J. Muell. Apparently rare. (3) Chartley.

b. *glabratus* Bab. Local. (3) Tixall; Codsall; Little Bosses, Stonnall; Stowe, near Chartley; Fradley. (4) Near Hinksford.

R. pulcherrimus Neum. Frequent. (1) Near Haymill, Biddulph; Lask Edge, *Painter.* (2) Sudbury; Forest Banks. (3) Hopton; Stowe; Weston-on-Trent; Drointon; Kingston; Salt; Ingestre; Milwich; Plaistow; Hints; Sandwell; Perry; Hamstead, &c. (4) Stourton; Himley; Oulton.

R. Lindebergii P. J. Muell. (1) Near Haymill Farm, Biddulph, *Painter.* (2) Reap's Moor; Archford Moor; near Alstonfield, *Purchas.* (3) Lane between Henhurst and Tattenhill, *T. Gibbs.* (4) Blockley, near Trysull.

R. villicaulis Koehl. (2) Mill Hayes Lane, Rudyard Hotel, *Painter*; Sudbury. (3) Fradswell, *Evans*; Streetley; Fradley. (4) Trysull Dingle.

Var. *β Selmeri* Lindeb. (1) Frequent near Biddulph Hall, *Painter.* (2) Alton. (3) Stowe, *Evans*; near Alrewas! *Gibbs*; Fradley; Pipe Hill; Little Hay; Weeford; Hardwick, near Stone; Norton Bog; Bassetts Pole; Codsall; Gailey; Pottall; &c. (4) Near Rainsford; Himley.

d. *calvatus* Blox. Rare. (1) Near Biddulph Hall, *Painter.* (2) Rudyard Reservoir, *Painter*; Harracles Mill, Horton, *J. G. Baker.* (3) Drointon; Hopton; Tixall; Ingestre; Salt; Streetley; Trickley. (4) Perton.

R. gratus Focke. (2) Heathy Wood, Rudyard, *Purchas.* I have not seen this in Staffordshire.

R. argentatus b. *robustus* (P. J. Muell.). (3) Stowe, near Chartley.

R. rusticanus Merc. Common and general. A variety with very narrow leaves abundant at (4) Wombourn.

R. pubescens Weihe. (2) Alton Common. (3) Fradley.

b. *subinermis* Rogers. (4) Seckley; Arley Wood. So named by Rev. W. Moyle Rogers.

R. thyrsoideus Wimm. (4) Severn-banks, Seckley, and Seckley Coppice.

R. lentiginosus Lees. Rudyard Reservoir, *Painter*.

R. macrophyllus W. & N. (3) Near Salt; near Stone; Daffodilly, near Barr Beacon; Gailey; Tixall. (4) Shelmore Wood; Norbury Park; Seckley Wood; Pattingham; Stewponey.
Var. *Schlechtendalii* Weihe. (2) Hardwick, near Stone.
Var. *amplificatus* Lees. (2) Sudbury, near Forest Banks; Dimmings Dale, Alton. (3) Near Gornal Wood; Stonnall; Little Aston; Hints; Weeford; Fradley; Salt; Ingestre; Chartley; Gailey; Hatherton. (4) Stourton; Perton; Pattingham; Oulton.

R. Sprengelii Weihe. (1) Rushton, *Bailey*; Forest Wood, near Gradbach. (2) Near Warslow, *Purchas*; Horton, *Carr*; Rudyard, *Bailey*; Ramshorne; Dimmings Dale; Wever Hill. (3) Streetley; Fradley; Chartley; Kingston; Gailey, Hatherton, &c.

R. micans Gren. & Godr. Very rare. Trickley Coppice, near Middleton.

R. hirtifolius Muell. & Wirtg. (1) Bemerton; Lask Edge. (3) Norton-in-the-Moors; Norton, *Painter*; near Bassetts Pole near Drayton.

R. pyramidalis Kalt. (1) Old Biddulph Hall, *White*; Lask Edge, *Painter*; Rudyard Reservoir, *Painter*; Hopton; Tixall; Newborough, Fradley, Aldridge, Streetley; Hatherton, &c. (4) Seckley Wood, "eglandular form," *W. M. Rogers*.

R. leucostachys Schleich. (1) Clamps Wood, *Purchas*; Rushton Spencer, *Painter*; near Ludschurch. (2) Alton Towers; Dimmings Dale; Wever Hill; Sudbury; Hanbury. (3) Knypersley, *Painter*; near Codsall, *Fraser*; Teddesley; Brewood; Salt; Milwich; Newborough, Rugeley. (4) Oulton, near Gnosall; Seckley Wood.

R. Boræanus Genev. Rare. (3) Near Milwich; Tixall Heath. (4) Foucher's Pool, near Hinksford.

R. mucronatus Blox. (2) Between Longnor Road and Brund Mill; near Overhurst Farm, *Purchas*; Cheadle Road from Alton; Dimmings Dale. (3) Chartley Moss; Kingston; Grindley; lanes about Codsall and Codsall Wood; Gailey; Canwell; Aldridge; Hayhead; Daffodilly. (4) Near Hinksford; Oulton, near Gnosall.

R. criniger Linton. (2) Near Rudyard Hotel, *Painter*; Alton Common. (3) Fradswell, *Evans*; Outwoods Burton! *Gibbs*; Chartley; Kingston; Gailey; near Pottall Reservoir; near Hopton; by Barr Park; Queslet; Pipe Marsh; Aldridge; Stonnall. (4) Hatherton.

R. anglosaxonicus Gelert. (2) By the Churnet, Alton; near Marchington; Oakamore. (3) Near Streetley; Stonnall; Little Hay; lane from Salt to Stafford; near Milwich; Codsall. (4) Stourton; Prestwood House; Swindon.
Subsp. *curvidens* A. Ley. (3) Hardwick Heath, near Stone. (4) Seckley Wood.

Subsp. *raduloides* Rogers. (1) Near the Bride Stones, Biddulph; near Woodside Colliery; Lask Edge, 900 ft., *Painter*.

R. infestus Weihe. (1) Near Rushton, *Bailey*. (2) Rudyard, *Bailey*. (3) Near Chartley Moss; Drointon; Tixall Heath; Blackheath Wood; near Drayton Lodge, road to Watling Street; near Barr Beacon; near Stonnall. (4) Lane from Foucher's Pool to Swindon; near Chase Pool Lodge.

R. Leyanus Rogers. (2) Alton Towers, *Purchas*. (3) Lane by Codsall Wood; road from Bassett's Pole to Watling Street.

R. radula Weihe. (1) Rushton, *Bailey*; near the Bride Stones, Lask Edge, *Painter*. (2) Near Rudyard, *Bailey*; near Cold Eaton Bridge, *Purchas*; by the river Dove, Dovedale! *Rogers*; Alton Towers; Marchington. (3) Codsall; Teddesley; Salt; Milwich; Sandon; Weston-on-Trent; Rugeley; Armitage; Streetley. (4) Wombourne; Arley.

Var. *anglicanus* Rogers. (3) Road from Pottall to Stafford; Codsall; Milwich; Salt; Fradley; Weeford; Hints; Streetley. (4) Smestow Mill; Pattingham.

R. podophyllus P. J. Muell. (1) Lask Edge, *Painter*. (2) Horton, *Painter*; Rudyard Lake, *Carr*; Alton Common. (3) Near Colton; Kingston; Bagots Wood; Abbots Bromley; Shenstone; near Barr Beacon.

R. echinatus Lindl. (2) Road from Sudbury to Forest Banks. (3) Salt; Sandon; Milwich; Coton; Fradswell; Hints; Stonnall; Perry; Sandwell; Codsall; Teddesley. (4) Smestow; Pattingham; near Prestwood House.

R. oigoclados Muell. & Lefv. Rare. (3) Trickley Coppice, near Middleton.

R. Newbouldii Bab. (3) Milwich; Kings Bromley; lanes about Hatherton; Calf Heath; lane by Gailey Reservoir. (4) Trysull Dingle; lane to Smestow Mill; Dimmings Dale, near Trysull.

R. Bloxamianus Coleman. (3) Prevailing bramble at Hatherton.

R. Babingtonii Bell Salt. (3) Lane to Walsall from Streetley. (4) Shelmore Wood, near Gnosall; near Stewponey; Baggeridge Wood; Himley; Seckley Wood.

R. Lejeunii W. & N. var. *ericetorum* Lefv. (4) Seckley Wood, abundant; Shelmore Wood, near Gnosall; canal-side, Oulton.

R. Bloxamii Lees, (2) Dimmings Dale, near Alton; road from Alton to Cheadle. (3) Stow; Sandon; Newborough; Fradley; Weeford; Hints; Wall; Stonnall; Alrewas; Little Hay; Sandwell; Streetley. (4) Seckley Wood; Arley.

R. scaber W. & N. (2) Rudyard, *Painter*. (3) Codsall; lane, Armitage to Coton; Collingswood; Needwood Forest; near Streetley. (4) Baggeridge Wood; Seckley Wood.

R. fuscus W. & N. (3) Near Knypersley, *Painter*; Trickley Coppice; hedge near Hints Hall; Drayton Bassett; Great Barr; Streetley.

Var. *nutans* Rogers. (3) Sutton road to Walsall; Trickley Coppice; Watling Street.

R. pallidus W. & N. (2) Hanbury. (4) Oulton, near Gnosall.

R. foliosus W. & N. (3) County lane, Codsall. (4) Shelmore Wood; wood near Aqueduct, Oulton; Norbury Park; Seckley Coppice.

R. rosaceus W. & N. (2) Dimmings Dale, near Alton. (3) Codsall Wood; County lane, Codsall. (4) Pattingham; Seckley Wood, abundant.

b. *hystrix* W. & N. (1) Between Lask Edge and Rushton Spencer, *Painter*. (2) Forest Banks; Marchington; Hanbury. (3) Sandon; Hamstall-Ridware, Salt; Stowe; Drointon; Fradley; Henhurst Wood, near Burton; Pipe Wood; Great Barr; Perry Wood; Handsworth Wood; Tixall; Codsall. (4) Norbury Wood; Seckley Wood; Pattingham.

e. *infecundus* Rogers. (2) Churnet Valley, near Alton. (3) Drointon; Hardwick; Sandon; near Kingswood Common. (4) Baggeridge Wood; Seckley Wood.

R. adornatus P. J. Muell. (3) Near Queslet. (4) Baggeridge Wood.

R. Koehleri W. & N. Rare. (3) Rakes End, near Rugeley. (4) Near Trysull; Pattingham.

Subvar. *distractus* Muell. & Wirt. (2) Rudyard Reservoir, *Painter*.

Subsp. *dasyphyllus* Rogers. *R. pallidus* Bab. Frequent. (1) Biddulph, *Painter*. (2) Near Beresford; Longnor, *Purchas*; Ramshorn; Alton Towers; Dimmings Dale. (3) Ingestre; Salt; Milwich; Sandon; Weston; Rakes End; Codsall; Teddesley; Wall, Perry Barr, &c. (4) Kinver; Stewponey; Arley.

R. fusco-ater Weihe. Rare. (3) Near Colton; Rugeley; Trickley Coppice. (4) Seckley Wood.

R. Bellardi W. & N. Rare. (2) Dimmings Dale, near Alton Towers. (4) Abundant near the aqueduct, Oulton, near Gnosall.

Var. *dentatus* Bab. (3) Abundant in the lanes about Codsall. (4) A robust form approaching type at Oulton.

R. serpens Weihe. (2) Rare, Dimmings Dale, near Alton, authenticated by Rev. W. Moyle Rogers.

R. hirtus Waldst. & Kit. Rare. (3) Codsall Wood. (4) Norbury Park; Oulton; Shelmore Wood.

Var. *rotundifolius* Bab. (3) Sandon; Hardwick; near Gnosall; lanes by Kingswood Common. (4) Seckley Wood; Oulton; Shelmore Wood.

[R. MINUTIFLORUS P. J. Muell. (4) Seckley Wood. See Handbook of Brit. Rubi, 89. I find a similar form in Anstey Wood, Warwickshire, which was named *R. minutiflorus* by Prof. Babington.]

R. velatus Lefv. (3) County lane, near Codsall.

R. dumetorum W. & N. var. *ferox* Weihe. (3) Anslow, *Evans*; near Stowe! *Gibbs*; Fradley; Rugeley; Newborough; Alrewas; Hints; Codsall; Tixall Heath; Aldridge.

Var. *diversifolius* (Lindl.). (2) Frog Hall; Alton; Sudbury; Hanbury. (3) Codsall; Pottall; Tixall Heath; Wall; Chesterfield; Shenstone; Rugeley; Drointon; Shirley Wich; Great Heywood, Salt, &c. (4) Swindon; Stourton.

Var. *tuberculatus* Bab. (1) Rushton. (2) Rudyard, *Bailey*. (3) Near Wolverhampton, *Fraser*; near Codsall; near Pottall; Sandon; Weeford; Queslet; Hayhead; Drayton Manor; Shenstone; Featherley. (4) Oulton.

Var. *concinnus* Warren. Near Alstonfield, *Purchas*; Ellaston; Wever Hill; Ramshorn; Alton. (3) Colton; Drointon; Weston-on-Trent; Hatherton, &c. (4) Hinksford.

Var. *fasciculatus* P. J. Muell. (2) Mill, Hays Lane, *Painter*; Ramshorn; Sudbury; Wever Hill. (3) Elford; Rugeley; Ingestre; Shirley Wich; Newborough, Great Barr, &c. (4) Oulton.

R. corylifolius var. *sublustris* Lees. (1) Rushton Spencer, *Painter*. (2) Longnor; near Wetton Mill; Alstonfield, *Purchas*; Alton; Wever Hill. (3) Salt; Ingestre; Brocton; Codsall; Teddesley; Milford; Great Heywood; Wall; Hamstead, &c. (4) Swindon.

Var. *cyclophyllus* Lindeb. (3) Near Shenstone.

R. Balfourianus Blox. (2) Hanbury; near Marchington. (3) Milford; Stowe, Chartley; Milwich; Kings Bromley; Cumborough; Fradley; Lichfield; Wall; Stonnall. (4) Arley.

R. cæsius L. *a aquaticus* W. & N. (1) Between Biddulph and Congleton Edge, *Painter*. (3) Weston-on-Trent; Drointon; Perry; Mill Green, Little Aston. (4) Norbury; Oulton.

β tenuis Bell Salt. (2) Alstonfield, *Purchas*. (3) Rugeley Junction. (4) Hinksford; Arley.

R. saxatilis L. (2) Broken limestone in the valleys of the Hamps and Manyfold, *Garn.* 377; Ape's Tor, Alstonfield, *Purchas*.

Geum urbanum L. Frequent.

G. rivale L. Very local. (2) Rare, Ilam, *Shaw*, 105; Cresswell, *Carter*; Morridge, *Garn.* 378; near Waterhouses; near Ipstone; Dovedale; Onecote. (3) In a meadow at Aldridge, *Pitt*, *With.* 469; Chesterfield, near Lichfield, *J. Power*; banks of Trent and canal feeder below Knypersley, *Painter*; between Walsall and Aldridge, *Rufford*, *Purt.* i. 242; Stretton Hall Grove, *Shaw*, 105; Stafford, *Fraser*; Cavershall; Lichfield, *Garn.* 378; near Ingestre; Kingston Pool; lane from Walsall to Pelsall; near Wolverhampton. (4) Penn, *Fraser*; Moreton, *Garn.* 378; near Baggeridge Wood. With semi-double flowers at (3) Cavershall, *Garn.* 378.

Var. *intermedia* Ehrh. (3) Kingston Pool.

Fragaria vesca L. Frequent.

Potentilla Fragariastrum Ehrh. Frequent.

P. sylvestre Neck. Common.

P. procumbens Sibth. Local. (1) Spring Coppice, Biddulph, *Painter*. (3) Fields, Knypersley, *Painter*; Hawkesyard Park, *Reader*. (4) Shelmore Wood; Norbury Park; Coldridge Wood, Arley.

P. reptans L. Frequent on banks.

P. Anserina L. Common on waysides.

P. argentea L. Rare. (3) On a bank near Kings Bromley, *J. Power*; wall-tops, Armitage, *Reader*. (4) Trescott, *Fraser*; Enville; Kinver Edge.

P. palustris Scop. (2) North end of Rudyard Reservoir, *Painter*; near Cheadle, *Carter*, 1839; near Brindley Ford and New Chapel, *Painter*. (3) Lichfield, *J. Power*; canal bank near Walsall. (4) Weston-under-Lizard, *Shaw*, 110; Highgate Pool, Enville; Trysull, *Fraser*.

Alchemilla arvensis Scop. Common.

A. vulgaris L. Locally common, fields and footways.

Agrimonia Eupatoria L. Frequent.

A. odorata Mill. In marly soils, rare. (3) Old marl-pit, Tixall.

Poterium Sanguisorba L. (2) Wever Hill! *Shaw*, 111; near Cheadle, *Carter*, 1839; Manyfold Valley; Dovedale. (3) Pendeford, *Fraser*; Bescott Junction; near Beacon Farm; Rushall Canal-bank; Sandwell.

P. POLYGAMUM Waldst. & Kit. Rare or overlooked. (4) Whittington Heath, *Fraser*.

P. officinale Hook. fil. Common in all parts of Staffordshire? *Garn.* 349. (2) Near the Delph House, *Carter*, 1839; Horton, *Painter*. (3) New Pool, Knypersley, *Painter*; Meadow, Cotton; osier-bed, Fazely, *J. Power*; marly soils about Stafford, *With.* 276; Kings Bromley, *Moore*; meadows by Trent, *Reader*; near Croxall, *J. Power*; Bloxwich; canal-bank, Daffodilly. (4) Blymhill, *Shaw*, 112.

Rosa pimpinellifolia L. South of the county, and has been found in the north on sandy soils, *Garn.* 376. I have not seen this in Staffordshire.

R. involuta Sm. b. *Sabini*. (2) Moorlands near Alstonfield, *Purchas*.

R. mollis Sm. (3) Between Stone and Stafford, *Garn.* 376; lane, Stonnall to Aldridge; near Streetley; Hayhead; near Brownhills; near Sandon. (4) Sedgeley, old lime-quarry.

R. tomentosa Sm. (2) Ecton Hill, *Fraser*; Alton; Ramshorn; Oakamore; Cotton; Wever Hill. (3) Tettenhall, *Fraser*; Tixall Heath; Farley; Ingestre; Drointon; Salt; Alglesea Coppice; Weston-on-Trent, Watford Gap; Shenstone; Streetley. (4) Near Himley, *Bree in Purt.* i. 767; Seisdon; Trysull.

b. *subglobosa* Sm. (1) Plentiful in Biddulph district, *Painter*. (2) Star Wood. Oakamore. (3) Wood Eaves; Hamstall-Ridware; Elford; Barr; Oscott; Little Perry.

c. *fœtida* Bast. (3) Near Little Aston Park.

d. *scabriuscula* Sm. (2) Forest Banks, Marchington. (3) County lane, Codsall; Weston-on-Trent; near Wolverhampton. (4) Near Wombourne; near Baggeridge Wood.

R. rubiginosa L. (2) Belmont, *Sneyd*, *Shaw*, 112. (3) Between Dudley and Tipton, *Stokes*, *With.* 458; Whitmore; Darlaston; Hill Chorlton, *Garn.* 376. (4) Willowbridge; Maer, *Garn.*

R. micrantha Smith. (2) Oakamore; near Cotton. (3) Lane from Teddesley and Hatherton.

R. obtusifolia Desv. (3) Near Stonnall; near Drayton.
Var. *frondosa* Baker. (1) Lane near Rushton Spencer. (3) South end of Knypersley Reservoir, *Painter*; near Drayton Bassett.
Var. *tomentella* Leman. (3) Codsall Wood. (4) Seisdon.

R. canina var. a. *lutetiana* Leman. (1) Near Bradley Pits, Biddulph; Rushton Spencer, *Painter*. (2) Rudyard Reservoir, *Painter*; common throughout county, *J. E. B.*
c. *sphærica* Gren. (2) By River Churnet, near Rudyard Reservoir, *Painter*; Oakamore.
d. *senticosa* Ach. (1) Lane near Rushton Spencer.
e. *dumalis* Bechst. Common throughout county.
Forma *verticillacantha* Mérat. (1) Drive from Biddulph Grange, *Painter*. (2) Alton Towers. (3) Hopton; Chartley; Weston-on-Trent; Sandon. (4) Wombourne.
f. *vinacea* Baker. (2) Oakamore.
Forma *latebrosa* Déségl. (4) Near Penns.
i. *urbica* Leman. (1) Near Biddulph, *Painter*. (2) Cotton; Oakamore. (3) Tettenhall, *Fraser*; Chartley; Rugeley Junction; Hamstall-Ridware; Wall; Chesterfield; Barr; Little Aston.
j. *dumetorum* Thuill. (1) Drive from Biddulph, *Painter*. (3) Lanes about Codsall. (4) Lanes about Pattingham.
k. *arvatica* Baker. (2) Farley, near Alton; Cotton; Draycott-in-Clay; Marchington. (3) Near Rugeley Junction; Armitage; Hamstall and Pipe Ridwares; Milwich.
Forma *cæsia* Sm. (3) Near Drayton Lodge; Little Perry; Perry Lane, Sandwell; Gayton; Hopton.
o. *Borreri* Woods. (3) Tettenhall, *Fraser*.

R. glauca Vill. (1) Rather common about Biddulph, *Painter*. (2) Moorland near Alstonfield; Oakamore. (3) Shirleywich; Sandon; Milwich; Weston-on-Trent; Hatherton; Netherton, near Armitage; Fradswell; Chartley; Colton; Blithfield. (4) Lanes near Arley.
b. *subcristata* Baker. (2) Cotton, near Oakamore. (3) Chartley; Weston-on-Trent; Ingestre; Milwich, Hopton; Salt; Shirleywich; Hamstall and Pipe Ridwares; near Shenstone; Codsall; Hatherton. (4) Coldridge Wood; Arley.
e. *coriifolia* Fr. (1) Common about Biddulph, *Painter*. (2) Coton Hill. (3) Codsall Wood; Salt; Shirleywich. (4) Norbury Park.
g. *Watsonii* Baker. Rare. (2) Coton Hill. (3) Watford Gap.

R. arvensis Huds. Hedges and waysides throughout the county,

Pyrus torminalis Ehrh. (2) Uttoxeter; near Longdon, *Garn.* 375; about Rolleston, *Mosley*. (3) Some ancient trees in Trentham

Park! towards Nowall, *Garn.* 375; Pendeford, *Pitt*, *With.* ed. iv. 450. (4) Near Upper Arley, *Garn.*; Seckley Wood.

P. Aria Ehrh. (1) Congleton Wood; Biddulph; near Cliff Hall, *Painter.* (2) On high limestone rocks, Beeston Tor; Beresford; Mill Dale, *Garn.* 372; Dovedale, *Bree*, *Purt.* i. 25.

b. *rupicola* Syme. (2) Dovedale! *Fraser.*

P. intermedia Ehrh. (4) Arley Dingle.

[P. DOMESTICA Ehrh. Arley Castle Grounds. Stated to have been introduced from Wyre Forest.]

P. Aucuparia Ehrh. In hedges and woods throughout the county, apparently wild in many districts.

[P. COMMUNIS L. (3) Kings Bromley, *Moore*; near Wolverhampton, and in many other localities, but apparently introduced.]

P. Malus L. a. *acerba* DC. Hedges throughout the county. (1) Gillow Heath, near Rudyard, *Painter.* (4) Lower Penn! Trysull! *Fraser.*

b. *mitis* Wallr. Rather rare. (1) Biddulph. (2) Near Horton, and Rudyard Reservoir, *Painter.* (4) Trysull.

Cratægus Oxyacantha L. a. *oxyacanthoides* Thuill. (2) Coton-in-the-Clay; near Hanbury. (3) Two or three trees between Great Heywood and Farley; Barton-under-Needwood; Little Aston. (4) Kinver; Arley.

b. *laciniata* Wallr. (2) Between Horton and Rudyard, fide *J. G. Baker*, *Painter.*

d. *monogyna* Jacq. Hedges, &c., throughout the county.

SAXIFRAGEÆ.

Saxifraga umbrosa L. (2) Belmont Woods, with *Pyrola minor*, 1837; rocky dell below Upper Cotton (Oakamore Star Wood), *Garn.* 370. Neither of these there in 1897.

S. granulata L. (1) Mow Cop, *Garn.* 370. (2) Roaches! *Garn.* 370. (3) Kings Bromley! *Moore*; near Stretton, *J. Power*; Tamworth, *Shaw*, 113; near Stafford! *Douglas*; How House Brook, *J. Power*; lanes about Queslet; Great Barr; Perry Barr! (4) Trysull; Wombourne.

S. tridactylites L. (2) Tutbury Castle, *Brown*, 254; Manyfold Valley, *Fraser.* (3) Abbey walls, Burton, *Shaw*, 112; Tixall; Ingestre; walls about Rushall. (4) Kinver; Dudley Castle walls.

S. hypnoides L. (2) Dovedale! *Carter*, 1839; Ecton Hill, *Fraser*; near Cheadle, *Carter*, 1839; Warslow, *Dr. Parsons.*

Chrysosplenium oppositifolium L. General in spongy places, *Garn.* 370. (1) Biddulph district, *Painter.* (2) Dimmings Dale! *Carter*, 1839. (3) Bentley, *J. Power*; Chartley Moss! *N. S. S. Rep.* 86; Cannock Chase! *Moore*; Sherbrook Valley, abundant. (4) Norbury Big Moss.

C. alterniflorum L. (1) Snowdon Pool, Madeley, *Garn.* 370; Crowborough Woods, *Painter.* (2) Moorlands at Belmont, *Pitt*, *With.* 393; near Ramshorn; Wootton Park, *Garn.* 370; Dimmings

Dale, *Carter*, 1839. (3) Yoxall Lodge, *Garn.* 370; Henhurst Dingle, *Moore*; paper mill near Lichfield, *J. Power*; Sherbrook Valley, abundant.

Parnassia palustris L. (2) Wever Hill, *Gibson*; below Alton Castle; Calton Moor, *Garn.* 362; Ecton, *Fraser*; near Coton and Whiston, *Carter*, 1839. (3) Lichfield, *Garn.* 362. (4) Maer; Willowbridge; Motty Meadows, Blymhill, "*Mr. Gibson*"; Offley, Hay, *Garn.* 362; Whittington Common.

Ribes Grossularia L. Introduced! *Garn.* 357. (2) Dove Rudyard, *Painter*; lanes near Alstonfield and Mill Dale; near Alton Towers. (3) Near Russells Hall, *Shaw*; Croxden Abbey, *Shaw*, 112; Hawkesyard Park, *Reader*; near Great Heywood; frequent in hedges, Stone; Sandon; Stowe; Hardwick; Tixall. (4) Baggeridge Wood.

R. alpina. (2) Found in a hedge at Ilam by *T. Sneyd*, *Shaw*, 112; abundant on limestone rocks, Wetton Valley, *Garn.* 359. (3) Knypersley Hall, planted, *Painter*; Needwood Forest, *Carter*, 1839.

R. rubrum L. Introduced! *Garn.* 358. (3) Wet copse near Armitage, *Reader*; wood at Tixall, in flower and fruit. (4) Brook at Trysull, *Fraser*.

R. nigrum L. Swamps along the Trent, introduced, *Garn.* 357! wet copse near Armitage, *Reader*; Oscott. (4) Moor near Moreton, *Shaw*, 112.

Crassulaceæ.

Cotyledon Umbilicus L. (2) Rocks under Heyley Castle, *Shaw*, 102; on a bank between Endon and Leek (there in 1893); Dovedale; Ilam, *Garn.* 372.

Sedum Telephium L. (2) Near Cheadle, *Carter*, 1839; Wetton Valley; Dovedale; Croxden Abbey, *Garn.* 372. (3) Rowley, *Shaw*, 116; Lichfield, *Garn.*; in a pasture by the mount at Mr. Pearson's, Tettenhall, *With.* 418.

S. album L. (3) Roof at Yoxall, *Garn.* 372.

S. acre Linn. Abundant on limestone, *Garn.* 372. (1) Betley, *Garn.* (2) Tutbury Castle, near Cheadle, *Carter*, 1839. (3) Stone, *Garn.*; Salt; Ingestre; Cannock.

S. reflexum L. (1) Biddulph Castle, *Garn.* 372; Biddulph Hall, *Painter*. (2) Tutbury Castle, *Dr. Hewgill.* (3) Croxden Abbey, *Garn.*; Tettenhall; Burton Abbey walls, *Garn.*

Sempervivum tectorum L. (3) Roof of outhouse, Wolverhampton! *Fraser*; King's Bromley, *Moore*.

Droseraceæ.

Drosera rotundifolia L. (1) Craddocks Marsh, *Fraser*. (3) Needwood Forest, *Shaw*, ii. 7; Abrahams Valley, near Rugeley! *Reader*; Norton Bog; Chartley Moss; Sherbrook Valley. (4) Bishops Wood, *N. S. S. Rep.* 91; Blymhill Heath, *Shaw*, 103.

D. intermedia Hayne. (1) Batterley, *Garn.* 362. (2) Near Cheadle, *Carter*, 1839. (3) Chartley Moss, *Garn.* (4) In a bog at Willowbridge, *Shaw*, 103; Fair Oak, *Garn.*

HALORAGEÆ.

Hippuris vulgaris L. (3) About a mile from Stafford, in ditches adjoining the foot-road to Aston, *With.* 5; Kingston Pool and Rickenscote, *Garn.* 34. (4) Perton canal reservoir.

Myriophyllum verticillatum L. (3) Kingston Pool. (4) North side of Aqualate Mere; Forton Moors, *Shaw*, 109; canal reservoir, Perton.

M. spicatum L. (2) In rapid rivers, Dove, &c., *Garn.* 407. (3) Knypersley Pool, *Painter*; canal near Great Heywood; canal near Shenstone; canal at Hayhead. (4) North side of Sitch Pool, Weston-under-Lizard, *Shaw*, 109; canal reservoir, Perton; pool in Shelmore Wood, near Gnosall.

M. alternifolium DC. (3) Pool near Ingestre; Hopton Pools, near Tixall; Sherbrook Valley; millpool, Little Aston. (4) Pool at Oulton; Foucher's Pool, near Swindon.

Callitriche stagnalis Scop. Frequent in pools, ditches, canals, &c.

C. hamulata Kütz. (2) Near Harracles Mill, north end of Rudyard Reservoir, *Painter*. (3) Near Knypersley Park, *Painter*; Burton, *Brown*, 280; lakes in Hawkesyard Park, *Reader*; Red House, Great Barr; Sherbrook Valley; Elford, near Croxall.

C. obtusangula Le Gall. (3) Armitage, *Reader*; pool at Amerton; stream near Stowe Pool; near Boar's Head, Perry Barr.

LYTHRARIEÆ.

Peplis Portula L. Common in wet places, *Garn.* 363. (3) Knypersley Reservoir, only seen once, *Painter*; Longdon Green, *Reader*; Sherbrook Valley.

Lythrum Salicaria L. By water, common, *Garn.* 373. (3) King's Bromley! *Moore*; near Stafford! *Douglas*; Pendeford; Kingston Pool; Hamstall-Ridware; Shirleywich; Great Heywood; Rugeley; Shenstone, Hamstead, &c. (4) Arley.

[L. HYSSOPIFOLIA L. Tamworth, *Miss Jackson, Garn.* 373, is probably an error.]

ONAGRARIEÆ.

Epilobium angustifolium L. Frequent and apparently self-sown. (1) Gradbatch, *Garn.* 367. (2) Near Cotton! *Carter*, 1839. (3) Whitmore; Pendeford! *Garn.*; Oldbury, *With.* 354; Fradley Heath! *J. Power* (there in 1898); Hawkesyard Park, *Reader*; Chartley; Grindley; Shirleywich, &c. (4) Pattingham Wombourne; Arley, &c.

E. hirsutum L. (1) Near railway station, Biddulph, *Painter*. (2) Near Alton. (3) Great Barr, Cannock, &c. (4) Trysull.

E. parviflorum Schreb. (1) Biddulph district, *Painter*. (2) Dimmings Dale, Alton. (3) Kingston Pool! *Fraser*; King's Bromley, *Moore*; Pipe-Ridware; Hayhead; Aldridge. (4) Foucher's Pool, Swindon; Stourton.

E. montanum L. Frequent, waysides and woods throughout the county.

f. *aprica.* (2) Embankment, Rudyard railway-station, *H. S. Thompson.*

E. roseum Schreb. (2) Uttoxeter, *Garn.* 367; Dovedale; near Sudbury. (3) Moddershall Pool, &c.; Pipe Marsh, *Garn.*; Longdon, *Reader.*

Var. *roseum-obscurum.* (3) Sandon.

E. adnatum Griseb. (3) Canal near Fradley, Aldridge. The true plant appears to be rare.

E. obscurum Schreb. (1) Rushton, *C. Bailey.* (2) Rudyard, *Bailey*; Horton, *Painter.* (3) Knypersley Park, *Painter*; Hawkesyard, *Reader*; Salt; Sandon; Great Heywood; Hardwick Heath, &c. (4) Seckley Wood.

E. palustre L. (3) Armitage; Kingston Pool; Sherbrook Valley; Fradley. (4) Oulton; Aqualate; Arley; Coldridge Wood; Seckley.

ŒNOTHERA BIENNIS L. Casual. (3) Birchills, near Walsall, *Reader.*

Circæa Lutetiana L. Common in shady places! *Garn.* 341.

C. alpina L. (1) Heyley Castle. (2) Woods at Froghall; Oakamore! *Garn.* 341.

Var. *intermedia* Ehrh. (2) Oakamore; Froghall, *Garn.*

CUCURBITACEÆ.

Bryonia dioica L. "Not in the north of the county," *Garn.* 467. (3) Very rare, sandy lane near Lichfield; hedge near Barton, *Shaw*, 100; Kings Bromley! *Moore*; on the wall of Etocetum at Wall! *Garn.*; Armitage, *Reader*; frequent about Tixall; Elford; Wigginton; Weeford; Little Aston; Norton Bog; Cannock, &c. (4) Enville, *Garn.*

UMBELLIFERÆ.

Hydrocotyle vulgaris L. (1) Biddulph Forge, *Painter.* (2) Rudyard Reservoir, *Painter*; Dimmings Dale; Alton Common. (3) Hawkesyard Park, *Reader*; Chartley Moss, abundant; Pipe Marsh; Norton Bog; Sherbrook Valley; Hopton; Cannock Chase. (4) Swindon; Oulton, near Gnosall.

Sanicula europæa L. General in woods! *Garn.* 357. (2) Dimmings Dale; Oakamore; Draycote-in-Clay; Wever Hill. (3) Burton! *Moore*; Elmhurst; Sherbrook Valley. (4) Seckley Wood, &c.

Conium maculatum L. (1) Canal near Biddulph Hall. (2) Tutbury, *Brown*, 257. (3) Kings Bromley; Stafford Castle Wood, *Moore*; Kingston Pool; Streethaye lane; Perry lane to Oscott. (4) Wombourne; abundant at Stourton.

SMYRNIUM OLUSATRUM L. Occasionally in and near old gardens. (3) Endon, *Garn.* 360.

Apium graveolens L. Perhaps wild, *Top. Bot.* (2) Uttoxeter, *Garn.* 350. (3) By the Salt brook, Shirleywich; Tamworth, *Garn.*; Branston, *Brown*, 255.

A. nodiflorum Reichb. fil. Common! *Garn.* 358.

Var. *repens* Hook. fil. (2) Oakamore. (3) Tamworth, *Garn.* 358; between Lichfield and the racecourse, *J. Power*; Shirleywich; Hopton Pool, Kingston; Sherbrook. (4) Aqualate; Ofley Hay.

A. inundatum Reichb. fil. (2) Rudyard, *Painter*; Knypersley Pools, *Painter*. (3) Wolstanton Marsh; Tamworth, *Garn.* 358; Needwood, *Gisborne*; Hopton Pool; Ingestre; Shirleywich; Norton Bog. (4) Blakemore Pool, near Norbury; Norbury Moss.

Cicuta virosa L. (1) Biddulph Hall, "planted," *Painter*. (3) Kingston Pool, near Stafford, *Stokes*, *With.* 300 (this pool is nearly drained; it was not there 1897–98, *J. E. B.*); Barton Mill, Borough End, *Brown*, 258.

Carum segetum Benth. & Hook. fil. (2) Marly banks, Hanbury. (3) Cornfields, Tamworth, *Garn.* 358.

C. PETROSELINUM Benth. & Hook. fil. (2) Croxden Abbey walls, introduced? *Garn.* 358.

C. CARVI L. (2) Endon, near Newcastle, *Dr. Howitt*, 358. (4) Between Wolverhampton and Sedgeley, *Garn.* 358.

Sison Amomum L. (3) Castle fields, near Stafford, *Moore*. I have not seen this in Staffordshire.

Sium erectum Huds. *S. angustifolium* L. *Garn.* 358. (2) Stream at Calton; stream near Sudbury. (3) Kings Bromley! *Moore*; Shirleywich; Sherbrook Valley; Hopton Pools. (4) Canal at Lower Penn.

[*S. latifolium* L. "Watery places, common," *Garn.* 358, is, I think, an error.]

Ægopodium Podagraria L. Common in garden hedges! *Garn.* 358. (1) Biddulph, *Painter*. (2) Draycote-in-Clay, frequent in the Dove basin. (3) Burton, *Brown*, 258; near Knypersley Hall, *Painter*; near nearly every village in the Trent basin. (4) Lower Penn! *Fraser*; near nearly every village in the Severn district.

Pimpinella Saxifraga L. (1) Near Rushton Spencer, *Painter*. (2) Coton Hill; Dimmings Dale; Alton. (3) Stoke-upon-Trent, *Garn.* 358; Kings Bromley! *Moore*, Hixon; Drointon; Weston-on-Trent; Stowe; Fradwell; Hayhead. (4) Oulton; Arley.

P. major Huds. Not rare on marl, or limestone! (2) Ilam! Dovedale; Alton! *Garn.* 358; Foxt; Froghall; Hanbury; Coton; Forest Banks. (3) Doxey, *Moore*; Rakes End, near Rugeley! Needwood Forest! The Oaks, near Burton, *Brown*, 256; Wednesbury Field, *Stokes*, *With.* 308; Sandon; Weston-on-Trent; Milwich; Newborough; Gayton. (4) Near Kinver Edge.

Conopodium denudatum Koch. Common! *Garn.* 358

MYRRHIS ODORATA *Scop.* (1) Near the Clough and Hall Farm, Biddulph, *Painter*; Biddulph, *Garn.* 360; Rushton. (2) Tutbury Castle, *J. Power*; Wetley! Warslow! Forsbrook! Onecoat, Bagnall;

and many other spots in plenty, *Garn.*; between Horton and Rudyard! *Painter*; Star Wood, Oakamore, in plenty; Ramshorn; Dovedale. (3) Tixall, *With.* 302.

Chærophyllum temulum L. Common, *Garn.* 360

Scandix Pecten Veneris L. Common amongst corn, *Garn.* 360.

Anthriscus vulgaris *Bernh.* (3) Waste places near Stafford; Lichfield, *Miss Jackson*, *Garn.* 360; by canal, Rugeley; Hill Ridware; Handsacre, *Reader*; Little Perry.

A. sylvestris *Hoffm.* Common! *Garn.* 360

Œnanthe fistulosa L. Frequent in ditches? *Garn.* 358. (3) Pitmore Pool, *Shaw*, 110; ditches near Armitage, *Reader*; Shirleywich; Oregreaves; Gailey; Hopton Pool; Hayhead. (4) Weston-under-Lizard, *Shaw*, 110; marshy field, Oulton; Lower Penn Marsh.

Œ. crocata L. Rare. (3) Hamstead, abundant in 1869, now rare; abundant, large pool at Sandwell, 1899. (4) Willowbridge, *Shaw*, 110

Œ. Phellandrium Lam. (2) Cheadle; Uttoxeter; Alsager, *Garn.* 359. (3) Stone Park; Church Eaton, *Shaw*, 110; near Stafford, *Douglas*. (4) Near Norbury Park, abundant.

Æthusa Cynapium L. Common! *Garn.* 359.

Silaus flavescens Bernh. (2) Not common; abundant about Uttoxeter, *Garn.* 358. (3) Branstone, *Brown*, 256; near Stafford, *Douglas*; Hayhead, near Walsall. (4) Near Swindon; only at rare intervals in the county.

Angelica sylvestris L. Common in wet places, *Garn.* 359.

PEUCEDANUM OSTRUTHIUM Koch. (2) Between Calton Moor House and Mayfield, *Garn.* 357. (3) Badderly Edge, *Garn.* 359.

P. sativum Benth & Hook. fil. (2) Near Longnor, in plenty, *Garn.* 359. (3) Tattenhall, *Brown*, 256; near Walsall; Hayhead. (4) Old quarry, Sedgeley; very local throughout county.

Heracleum Sphondylium L. Common! *Garn.* 359.

Daucus Carota L. Common! *Garn.* 359.

Caucalis arvensis Huds. (1) Betley, *Garn.* 359. (2) Uttoxeter! *Garn.* (3) Not uncommon near Burton, *Brown*, 256; near Stafford, *Douglas*; Oldbury, *Garn.* (4) High Offley; Perton.

C. Anthriscus Huds. Common! *Garn.* 359.

C. nodosa Scop. (2) Tutbury Castle Hill; rocks in Dovedale, *Garn.* 360. (4) High Offley, *Garn.*; Trysull.

ARALIACEÆ.

Hedera Helix L. Common! *Garn.* 357.

CORNACEÆ.

Cornus sanguinea L. (2) Coton; Uttoxeter; Tutbury; Hanbury, abundant. (3) Moss Pits, Stafford, *Moore*; Fradley; Milwich; Burton; Cudborough; Sandwell; Codsall, &c. (4) Trysull; Arley; Seckley; Pattingham, &c.

CAPRIFOLIACEÆ.

Adoxa Moschatellina L. (1) Drive from Biddulph to Knypersley Hall, *Painter*. (2) Abundant near Cheadle! *Carter*, 1839. (3) Shobnall; Anslow, *Carter*, 1839; Doxey and Burton, *Moore*; near Stafford, *Douglas*; near Westbromwich; near Stone; Hardwich; Sandon; Dawhead; Handsworth. (4) Lane at Trysull; woods, Enville.

Sambucus nigra L. Common! *Garn.* 361.

S. Ebulus L. (2) Tutbury Castle, *Pitt. With.* 311; Fauld, near Tutbury, *N. S. S. Rep.* 92. (3) Rare in Staffordshire, Branston, and Burton, *Shaw*, 112; near Newcastle, *Garn.* 361; Tamworth Castle towards the river, *With.* 311 (this, I think, is a Warwickshire station, *J. E. B.*); betwixt Rugeley and Wolsey Bridge, a quarter of a mile from the church, *J. Power*; near the mill, Marvesyn-Ridware, *Reader*.

Viburnum Opulus L. "Common in hedges near water," *Garn.* 361. (1) Drive from Biddulph to Knypersley Hall, *Painter*. (2) Rudyard, *Painter*; Cheadle, *Carter*, 1839; Coton; Calton. (3) Near Stafford, *Douglas*; Kings Bromley! *Moore*; Gnosall; Weston-on-Trent; Milwich; Sandon; Milford; Cannock; Handsworth. (4) Arley; Seckley; Norbury; Oulton.

Lonicera Periclymenum L. Common in woods and hedges! *Garn.* 355.

L. XYLOSTEUM L. (3) Sinai Park, *Brown*, 258; Needwood Forest, *Dr. Hewgill*, *Garn.* 355; Knypersley Hall, *Painter*. (4) Trysull Dingle, *Fraser*.

RUBIACEÆ.

Galium Cruciata Scop. Common! *Garn.* 348.

G. verum L. Common! *Garn.* 348.

G. erectum Huds. Doubtful. (3) Swynfen, near Lichfield, *Miss Jackson*; Burton, *Garn.* 348.

G. Mollugo L. Rare in the north of the county, *Garn* 348. (2) Forest Banks, near Marchington. (3) Rowley, *Garn.*; Sandwell. (4) Wombourne, *Fraser*; near Stewponey; Dudley, near Gornall Wood; Seckley; Arley; Coldridge Wood; Kinver.

G. saxatile L. Common in heathy places! *Garn.* 348.

G. sylvestre Poll. *G. Parisiense.* Frequent on walls and rocks ?? *Garn.* (2) Apes Tor and near Alstonfield. (3) Winshill, Shobnall, *Brown*, 258.

G. palustre L. Common! *Garn.* 348.

Var. *elongatum* (Presl.). (1) Near Rushton, *C. Bailey*. (2) Near Rudyard, *C. Bailey*. (4) Oulton, near Gnosall.

Var. *Witheringii* Sm. (3) On high but boggy parts of Handsworth Heath! *With.* 200. This locality is now built upon; Hardwick Heath, near Stone. (4) Oulton; Arley Wood.

G. uliginosum L. Common? *Garn.* 348. (4) Blymhill; Forton Wood, *Shaw*, 104. I have never seen this plant in the county, *J. E. B.*

G. Aparine L. Common! *Garn.* 348.

Asperula odorata L. Common in woods! *Garn.* (1) Swithamley Valley. (2) Near Cheadle! *Carter*, 1839; Rocester! *Fraser*; Oakamore; Marchington Forest Banks. (3) Trentham! *Garn.*; Bury Ring, near Stafford, *Moore*; Chartley; Stone; Hardwick; Sandon; Barr Beacon; Little Perry. (4) Trysull; Arley.

Sherardia arvensis L. Common in light soils! *Garn.* 348.

VALERIANEÆ.

Valeriana dioica L. Common? *Garn.* 342. (1) Drive from Biddulph Grange to Knypersley, *Painter*. (2) Dimmings Dale, Alton. (3) Kings Bromley! *Moore*; Blithfield Park! *Reader*; near Stafford, *Douglas*; Sherbrook Valley. (4) Seckley.

V. Mikanii Syme. Rare. (1) Rushton, *C. Bailey*. (2) Rudyard, *C Bailey*; Star Wood, Oakamore.

V. sambucifolia Willd. Frequent.

V. PYRENAICA L. Rare. (2) In a ravine near Oakamore (Star Wood), *Carter*! 1839. There in abundance in 1897, *J. E. B.*

CENTRANTHUS RUBER DC. "Old walls, Burton, but perhaps not truly wild." *Garn.* 342.

Valerianella Olitoria Poll. (2) Wetton Valley; Ecton Hill; Beeston Tor, *Garn.* 342; near Cheadle! *Carter*, 1839. (3) Lichfield, *Garn.*; on a wall, Colton, *Reader*; fallow field near Colwich; Buryfields, Stafford, *Moore*. (4) Fair Oak.

V. dentata Poll. (2) Near Cheadle, *Carter*, 1839. (3) Cornfields, Wootton, *Garn.* 342; Shobnall, *Brown*, 249; near Stafford, *Douglas*; cornfields, Armitage, *Reader*; allotments near Colwich.

Var. *β mixta* Dufr. (2) Beeston Tor, *Garn.* 343. (3) Shirleywich, *Garn.*

(Var. *eriocarpa* Desv. (2) Dovedale? Cheadle? *Garn.* 343; near Lichfield? *Garn.*)

DIPSACEÆ.

Dipsacus sylvestris L. (2) Eaton Woods, near Uttoxeter; Houndshill, Tutbury, *Garn.* 347; near Sudbury. (3) Chartley Castle; Tixall; Hopwas; Barton Green; Great Bridgeford. *Garn.*; near Stafford! *Douglas*; Shobnall, *Brown*, 259; Hayhead; Elford; Pipe Hill. (4) Blymhill, *Garn.*; Arley.

D. pilosus L. (2) Eaton Woods, near Uttoxeter, *Garn.* 348; Alton! *Carter*, 1839. (3) Hopwas, *Garn.*; Curborough Lane, *J. Power*; Shobnall, *Brown*, 259; Castle Ring, *Garn.*; near Stafford, *Douglas*. (4) Blymhill, *Shaw*, 103; Arley Wood; Coldridge Wood.

Scabiosa arvensis L. (1) Rushton Spencer, *Painter*. (2) Rudyard, *Painter*. (3) Frequent in cornfields! with white flowers, Cotonfield, Stafford, *Garn.* 348; Needwood Forest, *Brown*, 259. (4) Kinver, &c.

S. Columbaria L. Common? but seldom off limestone, *Garn.* 348. (2) Manyfold Valley; Dovedale! *Fraser*; Wever Hill! *Brown*, 260.

S. Succisa L. Common in pastures! *Garn.* 348. (3) Kings Bromley! *Moore*; Needwood Forest, *Brown*, 259. (4) Lower Penn *Fraser*.

COMPOSITÆ.

Eupatorium cannabinum L. Wet places and limestone hills, frequent! *Garn.* 400. (2) Abundant in Churnet Valley. (3) In one spot in Knypersley, *Painter*; Kings Bromley! *Moore*; Tixall; Hatherton; Weeford; Drayton Bassett; Hayhead; Little Perry. (4) Oulton; Norbury; Stourton.

Solidago Virgaurea L. Common on rocky ground, *Garn.* 401. (2) Dingle Cotton Hall! Alton; Warslow, *Painter*; Oakamore. (3) Burnt Wood, *Shaw*, 114; Knypersley and Lion's Paw Wood, *Painter*; near Walsall; *Rufford in Purt.*; Weston; Salt; Hayhead; Streetley. (4) Trysull; Seckley.

Bellis perennis L. Common! *Garn.* 341.

Aster Tripolium L. (3) Hollow meadows at Braunstone, *Shaw*, ii. 7; Tixall, *Shaw*, i. 99; in a meadow between the Trent and the canal Stoke; in a salt-marsh near Shirleywich, *With.* 711; salt-marsh near Ingestre, *J. Power*.

ERIGERON CANADENSE L. Ashwood, *Wainwright*, *Shaw*, ii. 6.

E. acre L. (2) Tutbury Castle, *Garn.* 401. (3) Stretton Bridge, on the Watling Streetway, *Shaw*, 103; Lichfield, *Garn.*; Great Barr Canal-bank. (4) Dudley Castle; sandy ground near Kinver, *Garn.*

Filago germanica L. Common! *Garn.* 400.

F. minima Fr. (2) Near Cheadle, *Carter*, 1839. (3) Tittensor, *Garn.* 400. (4) Weston-under-Lizard, *Shaw*, 105; pool near Himley Wood.

Gnaphalium sylvaticum L. (3) Lanes about Moddershall, *With.* 698; Hawkesyard Park, *Reader*. (4) Blymhill, *Shaw*, 105; Kinver.

G. uliginosum L. Common! *Garn.* 400.

Antennaria dioica R. Br. (2) Limestone hills, Wetton Valley, *Garn.* 400.

Anaphalis margaritacea Benth. & Hook. fil. (3) In a meadow at Longdon, *Mr. Salt*, Bot. Guide, 535.

Inula Helenium L. (1) Biddulph Castle, *Garn.* 400. (4) Himley Wood, *Bree*, *Purt.* i. 410.

I. Conyza DC. (4) Wombourne, *Garn.* 401; roadside near Dudley Castle, *Wainwright*, *Shaw*, ii. 6; Baggeridge Wood! *Fraser*; near Himley Wood, abundant; Coldridge Wood, near Arley, abundant.

Pulicaria dysenterica Gaertn. Common in wet places! *Garn.* 401. (1) Biddulph Grange, *Painter*. (2) Rudyard Reservoir, *Painter*. (3) Near Stafford, *Douglas*; Armitage; Rakes End; Newborough, &c. (4) Lower Penn; Arley.

Bidens cernua L. Frequent! *Garn.* 400. (3) Canal, Handsacre, *Moore*; canal, Armitage, *Reader*; Great Heywood; Drointon;

Farley; Shirleywich; Weston-on-Trent; Kingston Pool. (4) Coton-in-the-Elms, *Brown*, 260.

Var. *radiata* Sond. (3) In a splashy rivulet at the bottom of Tittensor Common, *Stokes*, *With.* 690.

B. tripartita L. (2) Rolleston, *Brown*, 260. (3) Wolstanton Marsh, *Spark*, *Garn.* 400; Knypersley Reservoir, *Painter*; Canal, Armitage, *Reader*; Horninglow; Shobnall, *Brown*; Drointon; Farley; Hamstall-Ridware; Harbourne Reservoir. (4) Perton Pool! *Fraser*; pool by Himley Wood.

Achillea Millefolium L. Common! *Garn.* 402. With rose-coloured flowers at (3) Tixall; Fradley. (4) Oulton.

A. Ptarmica L. Common? *Garn.* 402. (3) Needwood Forest! *Brown*, 260; Walsall! Wednesbury, *Fraser*; King's Bromley! *Moore*; Sherbrook Valley. (4) Shelmore Wood; Oulton.

Anthemis Cotula L. Frequent! *Garn.* 402.

A. arvensis L. Common! *Garn.* 402.

A. nobilis L. Not common! *Garn.* 402. (3) Cannock Chase. *Brown*, 241; on the road from Hednesford to Stafford, *Pitt*, *With.* 723; Longdon Green, *Reader*; Lichfield, *Garn.* 402. (4) On Blymhill Lawn, in great abundance, *Shaw*, 99.

Chrysanthemum segetum L. (1) Hayhill Farm, Biddulph, *Painter*. (2) Ramshorn. (3) Outwood Hills, *Brown*, 261; King's Bromley, *Moore*; near Newton Road! *Fraser*; Stoke-upon-Trent, *Garn.* 402; Weston-on-Trent; Fradley; Rakes End. (4) Wombourne.

C. Leucanthemum L. Common in fields, &c.! *Garn.* 402.

C. Parthenium Pers. Common in waste places? *Garn.* 402. I have never seen this in the county, except as an outcast from gardens.

Matricaria inodora L. Common! *Garn.* 402.

M. Chamomilla L. Common in cornfields! *Garn.* 402; rayless form near Burton-on-Trent, *Dr. Parsons*!

Tanacetum vulgare L. Common in hedges? *Garn.* 400. (2) Near Tutbury, *Brown*, 260; Forest Banks; near Sudbury. (3) Tattenhill; Beamwood, near Burton, *Brown*, 260; King's Bromley, *Moore*; Brereton, *Reader*; Shirleywich; Hopton; Fradley; Alrewas; Little Aston, &c. (4) Lower Penn! *Fraser*; Stourton.

Artemisia Absinthium L. (3) Between Rickerscote and Coppenhall, *Garn.* 400. (4) Willowbridge Lodge, *Garn.*; near Kinver, *Fraser*; Sedgeley Old Quarry.

A. vulgaris L. In hedges and waste places. Common! *Garn.* 400.

Var. *coarctata* Forcell. Local. (3) Mill Green; Stonnall; Tixall; Tixall Heath. (4) Banks near Patsull; Perton.

Tussilago Farfara L. Common on clay and land too much ploughed! *Garn.* 401.

Petasites officinalis Moench. (1) Biddulph, *Painter*. (2) Churnet Valley; Draycote-in-Clay; Marchington; Hanbury. (3)

Moddersall, near Stone, *With.* 704; Brown Edge, near River Trent, *Painter*; Baswich; Kingston Pool; Blithfield; Abbots Bromley; Sandon; Weston; Salt; Shenstone, Farley; Little Aston. (4) Compton! Sedgeley! *Fraser*; Swindon; Stewponey, Wightwich, &c.

P. ALBUS Gaertn. (2) Near Cheadle. (3) Butterton, *Bostock*, *N. S. S. Rep.* 91.

DORONICUM PARDALIANCHES L. (2) Dimsdale, *Spark*, *Garn.* 401; near Ramshorn, abundant. (3) Abnals, Lichfield, *J. Power*.

Senecio vulgaris L. Common! *Garn.* 401.

S. sylvaticus L. (2) Bagnall; Uttoxeter! *Garn.* 401. (3) Stafford; Lichfield, *Garn.*; Cannock! *Fraser*; Knypersley, *Painter*; Weeping Cross, *Moore*; Tixall Heath; Hopton; Stowe; Ingestre; Rake's End; Fradley; Pipe Hill; Barr; Oscott; Hints; near Walsall.

S. viscosus L. Common? *Garn.* 401. (3) Stoke, *Garn.* I have not seen this in Staffordshire, *J. E. B.*

S. erucifolius L. *Garn.* 401. (1) Madeley, *Garn.* (2) Uttoxeter! *Garn.* (3) Near Newborough; Tixall Heath; Hints. (4) Motty Meadows, Blymhill, *Shaw*, 113; Arley.

S. Jacobæa L. Common! *Garn.* 401.

S. aquaticus Huds. Common! *Garn.* 401.

S. SARRACENICUS L. (3) Near Compton Mill; Bradwell; Needwood Forest, *Garn.* 401.

Carlina vulgaris L. Hilly pastures, abundant on limestone, *Garn.* 400. (2) Manyfold Valley, *Fraser*; Wever Hill. (3) Hayhead. (4) Sandy fields at Kinver! Enville, *Garn.*; Wren's Nest.

Arctium majus Bernh. (3) Kingston, near Uttoxeter. (4) Wren's Nest.

A. nemorosum Lej. (1) Rushton, *C. Bailey*. (2) Rudyard, *C. Bailey*; Hanbury. (3) Salt; near Gailey Reservoir; Queslet. (4) Near Foucher's Pool; Coldridge Wood, near Arley.

A. minus Bernh. (1) Biddulph, *Painter*. (2) Hanbury. (3) King's Bromley, *Moore*; Gnosall; near Bagot's Wood, Sandon; near Stonnall; Weeford. (4) Wren's Nest! *Fraser*; Stourton; Himley; Norton; Arley; Coldridge Wood.

A. intermedium Lange. (3) Lane from Bagot's Wood to Kingston; Showls Wood, Kingston. (4) Arley.

Carduus nutans L. Frequent, but not general, *Garn.* (2) Dovedale; Wever Hill; Hanbury. (3) Near Stafford! *Douglas*; King's Bromley! Sandon; Shirleywich; Lichfield; Shenstone; Drayton Bassett; Streetley; Little Aston, &c. (4) Blymhill, *Shaw*, 101; Trysull! *Fraser*.

C. crispus L. (2) Dovedale; Wever Hill. (3) Near Chartley Castle; near Burton-on-Trent, *Shaw*, 101; Stafford, *Garn.* 399; Stone; Weston-on-Trent; Fradley; near Pipe Marsh. (4) Kinver, *Garn.*

C. lanceolatus Willd. Common! *Garn.* 399.

Var. *flore albo.* (3) Rake's End.

C. eriophorus Roth. (3) Barrow Hill, *Garn.* 399; roadside between Wednesbury and Bilston, *Shaw*, 101; Hayhead. (4) Wren's Nest! Sedgeley Lime Works! *Garn.*; near Burlington, in the parish of Sherrif Hales, *Shaw*, 101.

C. palustris Willd. Common! *Garn.* 399.

C. pratensis Willd. (2) Hanbury; Sudbury, *Garn.* 399. (3) Needwood Forest, *Garn.*; near Barr Beacon; Shenstone, Chesterfield. (4) Blymhill, *Shaw*, 101; Willow Bridge; Aqualate, *Garn.*

C. heterophyllus Willd. (2) Mixon; Longnor, Warslow; Hamps Valley, *Garn.* 399; Ecton Hill, *Fraser*; Beresford Dale, *Dr. Parsons*! Dovedale.

C. arvensis Hoffm. Common, *Garn.* 399.

ONOPORDON ACANTHIUM L. (4) Aqualate, in the park; Broome, *Garn.* 399.

MARIANA LACTEA Hill. (2) Alton, *Garn.* 399. (3) Near Stone, Burton, *Garn.*; Walton; Shobnall, *Brown*, 263; railway cutting near Rugeley, apparently self-set, 1897.

Serratula tinctoria L. Common in woods? *Garn.* (2) Rolleston; Henhurst, *Brown*, 262; Ecton Hill, *Fraser*. (3) Great Heywood; Bishop's Hill, Newborough. (4) Seckley Wood.

Centaurea nigra L. Common! *Garn.* 402; with rayed flowers at Trysull.

C. Jacea L. (4) Cradley Park, *Garn.* 402.

C. Scabiosa L. (2) Near Tutbury, *Shaw*, 399; Wever Hill. (3) Near Stafford, *Garn.* 402; sand-pits, West Bromwich; Wall; Stonnall; Little Aston; Barr Beacon; Great Barr: Hayhead. (4) Kinver! *Garn.*; Nurton; Pattingham, *Fraser*.

C. Cyanus L. (1) Betley, *Garn.* 402. (2) Ramshorn. (3) Maer; Batchacre; along the railway, Walsall, *Garn.*; Hamstead; Witton; King's Bromley.

Cichorium Intybus L. (3) Knight's lands (*Dr. Hewgill*), Tamworth Castle; between Lichfield and Burton, *Garn.* 399; Stafford, *Douglas*; Haughton; King's Bromley, *Moore*.

Lapsana communis L. Common! *Garn.* 398.

Picris hieracioides L. (2) About Tutbury, Ecton Hill; Dovedale, *Garn.* 397; Rolleston, *Brown*, 264. (4) Sedgeley Beacon.

Crepis virens L. Common! *Garn.* 397.

C. paludosa Moench. (1) On the banks of a rivulet, Biddulph, *Shaw*. (2) Lion's Paw Wood; Cliff Wood, *Painter*. (3) Between Whitmore and Acton, *N. S. S. Rep.* 89.

Hieracium Pilosella L. Common! *Garn.* 398.

H. murorum L. Common on limestone rocks? *Garn.* 398. (2) Dovedale, rare. (4) Blymhill, *Shaw*, 105.

H. anglicum Fr. (2) Dovedale, sparingly.

H. vulgatum Fr. (1) Rushton; Biddulph, *Painter*. (3) Knypersley Park, *Painter*; Bury Ring, near Stafford, *Moore*; walls, Hawkesyard, *Reader*. (4) Weston-under-Lizard.

H. maculatum Sm. (? 3) Old walls, Codsall, *Fraser*.

H. sciaphilum Uechtr. (1) Tower Hill, Mow Cop, *Painter*.

H. tridentatum Fr. (2) Alton. (3) Sherbrook Valley; Cannock Chase; Great Barr. (4) Trysull.

H. boreale Fr. (*H. sabaudum* Sm.). *Shaw*. (1) Gutter Lane, near Biddulph, *Painter*. (2) Near Rolleston, *Brown*, 265. (3) Woodside Colliery, near Biddulph, *Painter*; between Wolverhampton and Bilston, *Fraser*; King's Bromley, *Moore*; Needwood Forest, *Brown*; Hamstead; Queslet; Ingestre. (4) Blymhill, *Shaw*, 105.

H. umbellatum L. (1) Gutter Lane, between Biddulph and Trent Valley, 700 ft., *Painter*. (3) Woodside Colliery, near Knypersley, *Painter*; Newton! *Fraser*; quarry, Ingestre; Stonnall; Queslet; Little Aston; Hamstead. (4) Blymhill, *Shaw*, 105; near Pattingham, *Fraser*.

[HYPOCHÆRIS GLABRA L. "Gravelly places," *Garn*. 398. I have searched for this without success in all the more likely districts, *J. E. B.*]

H. radicata L. Common! *Garn*. 398.

Leontodon hirtus L. (1) The drive to Biddulph Grange, *Painter*. (2) Ramshorn, &c., "common"; Bagnall. (3) Barlaston Common, Wolstanton Marsh, *Garn*. 398; near Hawkesyard Park, *Reader*; Hamstead, &c. (4) Near Himley; Swindon.

L. hispidus L. Common, meadows and footways! *Garn*. 398.

L. autumnalis L. Common! *Garn*. 398.

Taraxacum officinale Web. a. *Dens-leonis* Desf. Common! *Garn*. 377.

b. *erythrospermum* (Andr.). (2) Uttoxeter. (3) Brereton, *Reader*; Drayton; Hamstall-Ridware; Colton; Queslet; Draycote. (4) Trysull, *Fraser*; Gornal Wood.

c. *palustre* DC. (2) Horton, *Painter*. (3) Knypersley Mill, *Painter*; Hawkesyard Park, *Reader*; Sherbrook Valley; near Milford; Alrewas. (4) Penn Common, *Fraser*; Seckley Wood.

d. *udum* Jord. (3) Hawkesyard Park, *Reader*.

Lactuca virosa L. (2) Common about Tutbury, *Garn*. 397. (3) Hamstall-Ridware; by the roadside between Tatenhall and Braunston, *Shaw*, ii. 7; near Chartley Castle, *Shaw*, 105. "I once found it near Walton Railway, Station," *Brown*, 264.

L. muralis Fres. Common and general? *Garn*. (2) Rudyard Reservoir, *Painter*; Winshill, Tutbury, *Brown*, 264; Alton; Oakamore; Fort; Coton-in-Clay. (3) Near Knypersley Pools and Tower, *Painter*; Longdon, *Reader*; Milwich; Weston-on-Trent; Hayhead; Queslet; Barr Park; Gnosall. (4) Himley.

Sonchus oleraceus L. Common! *Garn*. 397.

S. asper Hoffm. Common.

S. arvensis L. Common.

[*S. palustris* L. About Stafford, *Garn*. 397. This is probably the large marsh form of *S. arvense* abundant at Kingston Pool, *J. E. B.*]

Tragopogon pratense L. (*T. major* Garn.), (2) Lime-kilns near Caldon Place, &c., *Garn.* 397. (3) Near Stafford, *Douglas.* (4) Sedgeley, old quarry.

b. *minus* (Mill.). Common! *Garn.* 397.

T. PORRIFOLIUM L. (2) Rolleston, *Sir O. Mosley.* (3) Tamworth, *Reader.* (4) Weston-under-Lizard, *Garn.* 397.

CAMPANULACEÆ.

Jasione montana L. Common? *Garn.* 354. (1) Biddulph; Rushton Spencer, *Painter.* (2) Rudyard, *Painter*; near Cheadle, *Carter*, 1839; Longnor, *N. S. S. Rep.* 91. (3) Near Knypersley Hall, *Painter*; near Westbromwich; near Newton. (4) Seckley Wood.

Wahlenbergia hederacea Reichenb. (3) Near Lichfield, *Miss Jackson, Garn.* 355; Rugeley and Beaudesert, *J. Power*; in wet places, Cannock Chase, *Brown*, 266.

Campanula Trachelium L. (2) Marchington, *Brown*, 266; Houndshill; abundant in the Hamps Valley, *Garn.* 354. (3) Rowley, *Shaw*; Barton; Burton; Perry Barr! *Garn.*; Yoxall, *Moore*; Blithfield Park; near Chartley Moss; Great Barr. (4) Sedgeley, *Fraser*; Wood-Eaton, *Shaw*, ii. 6.

C. latifolia L. (2) Near Croxden Abbey, *Shaw*, 101; Uttoxeter, *Dr. Parsons*! near Cheadle Castle, *Carter*, 1839; Ilam; Oakamore; Ellaston. (3) Rowley, *Shaw*, ii. 6; Stoke; Darlaston; Barton; Lichfield; Woodford, *Garn.* 354; Shobnall; Needwood Forest, *Brown*; Hopwas Wood! *J. Power*; one mile south of Stafford, *With.* 239; Stafford Castle, *Fraser*; Blithfield Park; near Canwell Hall.

Var. *flore albo.* (3) At Darlaston near Stone, *Foster, Shaw*, 101.

C. rotundifolia L. Common, *Garn.* 354.

Var. *alba.* (2) Near Cheadle, *Carter*, 1839.

Var. *lancifolia* Mert. & Koch. (3) Sutton Road, near Barr Beacon.

C. rapunculoides L. (3) Hedge near Tamworth, *Dr. Parsons*!

C. Rapunculus L. (3) Railway cutting, Tamworth, *N. S. S. Rep.* 1893; Priestwood. (4) Enville, *Stokes, With.* 238; Blymhill, near the parsonage; Dudley, *Garn.* 354.

C. patula L. (3) Between Lichfield and Shenstone, *J. Power*; near the bath, Lichfield, *Woodward*; Burton, *Garn.* 354. (4) About Enville, *Purt.* i. 119; near Trysull.

Specularia hybrida A. DC. (3) In a turnip-field, Kingston Hill, near Stafford, *Garn.* 354; Hamstead railway cutting, 1868.

VACCINIACEÆ.

Vaccinium Vitis-Idæa L. (1) Trough Stone and Wickerstone Rock, *Painter.* (2) Belmont, *Shaw*, 115; Rudyard, *Painter*; near Cheadle, *Carter*, 1839; Oakamore, *Brown*, 266; The Roaches, near Leek! *Dr. Parsons.* (3) Cannock Wood, *Rufford, Purt.* i. 731; Cannock Heath! *Dr. Stokes*; Chartley Moss; Norton Bog; near Hednesford; Pipe Marsh. (4) Maer! *Shaw*, 115.

V. Myrtillus L. Frequent on grit or sandstone; rare on limestone, *Garn.* 367. In all the districts.

V. MYRTILLUS × V. VITIS-IDÆA (*V. intermedium* Ruthe). (3) Cannock Chase, *Garn.*; Norton Bog, abundantly in flower, 1898. (4) Maer Wood, *Garn.*

Schollera Oxycoccus Roth. (1) Near Wickerston Rocks, *Painter.* (2) Near Endon, *N. S. S. Rep.* 103; near Cheadle, *Carter*, 1839. (3) Cannock Chase! *Moore*; Chartley Moss; Sherbrook Valley; Norton Bog. (4) Bishop's Wood, near Eccleshall, *With.* 366; Norbury Big Moss, abundant, 1897.

ERICACEÆ.

Andromeda Polifolia L. (1) Congleton Moss; Craddocks Moss, *N. S. S. Rep.* 86. (3) Chartley Moss, *Mr. Bagot, With.* 389 (there in 1886); Whitmore, *N. S. S. Rep.* 86.

Calluna Erica DC. Common on heaths! *Garn.* 367.

Var. *incana* Auct. (3) Abundant, Sherbrook; Pipe Marsh; Cannock Chase, &c.

Erica Tetralix L. Common on moist heaths! *Garn.* 363. (1) Lask Edge; Biddulph Moor! *Painter.* (2) Rudyard! *Painter.* (3) Knypersley Park, *Painter*; Cannock; Norton Bog; Hardwick Heath, &c.

E. cinerea L. Common on stony heaths! *Garn.* 366.

Pyrola rotundifolia L. (2) Wood near Cotton Hall, *Dickenson*, Belmont, *Sneyd, Shaw*, 111. (3) Chartley Moss, *Bagot, With.* 391 (there in 1886); near Stafford, *Douglas.*

P. media Sw. (4) Cradley Park, near Stourbridge, *Scott, Purt.* iii. 35.

P. minor L. (2) Near Cheadle; Oakamore, *Carter*, 1839; Cotton Hall; Belmont; Basford, *Garn.* 369.

MONOTROPEÆ.

Hypopitys Monotropa Crantz. (4) Lord Stamford's Wood at Enville, *With.* 389; formerly at Gospel End, *Wainwright, Garn.* 369.

PRIMULACEÆ.

Hottonia palustris L. (3) Between Braunston and Burton, *Shaw*, ii. 7; roadside from Lichfield to Barton, *Pitt, With.* 232; Tamworth, *Bree*; Walsall, *Rufford, Purt.* i. 123; Newcastle, *Spark*; Elford, Barton, *Dr. Hewgill, Garn.* 352; in a ditch near Navigation Bridge, Fazley, and near Salter's Bridge, *J. Power.* (4) South side of the Aqualate, *Shaw*, 105.

Primula acaulis L. Common on banks and in woods! *Garn.* 352.

Var. b. *caulescens* Koch. *P. elatior* Garn. 352. (2) Croxden; Hollington; Oakamore! *Garn.*; Wever Hill, *Carter*, 1839. (3)

Pyre Hill, near Stone, *Moore*; Chesterfield, *J. Power*. (4) Blymhill, *Shaw*, 111; near Patsull.

P. veris L. Common in fields! *Garn.* 352.

Lysimachia vulgaris L. (2) Rudyard Reservoir, *Painter*. (3) Marshes, Trentham! Clayton; Lichfield, *Garn.* 351; near Drayton Bassett. (4) Blymhill, in the Motty Meadows, *Shaw*, 101.

L. Nummularia L. (2) Alton; Ramshorn. (3) Eccleshall; Buttermilk Hill, Burton, Curbro Woods, *Garn.*; near Wallsall; Hayhead; Aldridge; Wolsey Bridge, near Rugeley; Hamstall-Ridware. (4) Oulton; near Arley.

L. nemorum L. Common in shady places, *Garn.* 351. (2) Hanbury Woods. (3) Near Hayhead, Little Aston; Cannock Chase. (4) Cowhay Wood; Weston-under-Lizard, *Shaw*, 107; Himley; Baggeridge; Arley Wood.

Glaux maritima L. (3) Salt-marsh near Ingestre, *With.* 263; salt-marsh near Tixall, *Shaw*, 105. Probably both these records are from the same locality, *J. E. B.*

Anagallis arvensis L. Common in cornfields! *Garn.* 351.

A. cærulea Schreb. (3) Burton, but rare, *Brown*, 276.

A. tenella L. (3) Tettensor Hills; Upper Pool at Soho! Needwood Forest, *With.* 235; Burton; Lichfield, *Garn.* 351; Chartley Moss, *Carter*, 1839; Cannock Chase; Sherbrook Valley. (4) Offley Hay, *Garn.* 351.

Centunculus minimus L. (3) Blithfield, *Bagot*, *With.* 196.

Samolus Valerandi L. (4) Aqualate Mere, south side, *Fraser*! Mott's Well, near Smallwood Manor, *Brown*, 276.

OLEACEÆ.

Fraxinus excelsior L. Common, *Garn.* 341.

Ligustrum vulgare L. "Wild in the Hamps Valley," *Garn.* 340. (2) Forest Banks, Marchington. (3) Great Heywood, Weston-on-Trent; near Stafford. Doubtful as a native.

APOCYNACEÆ.

VINCA MAJOR L. Frequent, *Garn.* 354. (3) Tipton, *Wainwright*, *Shaw*, ii. 6. (4) Brook-bank, Kinver, *Fraser*.

V. minor L. (1) By the rivulet below Biddulph Castle, *Garn.* 354. (2) Rolleston, *Brown*, 267; Uttoxeter, *Garn.* (3) Walton, *Brown*; Holloway, Gossbrook, *Garn.*; Newcastle road to Longton, *L. Grove*, *Shaw*, 95; near Codsall; Barr Beacon. (4) Enville.

GENTIANEÆ.

Blackstonia perfoliata Huds. (2) Apedale, *Garn.* 365; with white flowers, Heyley Castle, *Wainwright*, *Shaw*, ii. 1. (3) Lime Hills, near Dudley Castle, *W. in Shaw*; near Lichfield, *Garn.*; Ranton Abbey, *With.* 363; Tillets Rough, near Walsall; Hayhead; California. (4) Maer Heath, *Garn.*; Oulton; Arley Wood, abundant.

Erythræa Centaurium Pers. (1) Biddulph Grange and New Pool, *Painter*. (2) Alton; Wever Hill. (3) Shobnall, *Brown*; Hoar Cross; Weeping Cross! *Moore*; Tillets Rough; Armitage; Colton; Hamstall-Ridware; Blithbury; Sherbrook Valley. (4) Trysull; Wombourne, *Fraser*; Arley and Coldridge Wood.

Gentiana Amarella L. Common in all hilly pastures? *Garn.* 357. (2) Near Oakamore, *Brown*, 267. (4) Sedgeley, *Fraser*.

G. campestris L. Frequent with *Amarella?* Garn. 357. (2) Near Wever Hill. *Carter*, 1839. (3) Burfield, near Wolsey field, *Shaw*, 105.

Menyanthes trifoliata L. (1) Biddulph Hall, planted, *Painter*. (2) Cotton, *J. Power*; Whiston, *Carter*, 1839; Endon, *N. S. S. Rep.* 93. (3) Fradley; Onslow; and near Burton, *Brown*, 268; abundant in pits, Ranton Abbey, *With.* 232; Chartley Moss; Sherbrook Valley; Norton Bog. (4) Near Stourbridge, *Purt.*; Blymhill, in marl-pits, *Pitt*, *Shaw*, 107; Bishop's Wood, *N. S. S. Rep.* 92.

POLEMONIACEÆ.

Polemonium cæruleum L. (2) Wetton Valley, *Carter*, 1839; about Thor's Cave; Cavershall Meadows; Ecton Hill; Dovedale, *Garn.* 354. (3) Wood Eaves, Needwood Forest, *Garn.*; near Drakesford Farm, *Brown*, 268. (4) Blakemere Pool, near Norbury.

BORAGINEÆ.

Cynoglossum officinale L. (1) Frequent on coal-pits, Betley; Madeley, *Garn.* 351. (3) Outwood Hills, Tattenhall, *Brown*, 468. (4) Wren's Nest.

Symphytum officinale L. (2) Marchington, *Garn.* 350. (3) Near Stafford, *Douglas*; Burton, *Shaw*, 114; Lichfield; Perry Hall, *Garn.*; near Stowe; Fradley; Westbromwich; Hamstead; Little Aston. (4) Wombourne, *Garn.*; Stourton; Trysull.

S. tuberosum L. (2) Longnor; Wetton Valley. (3) Lichfield, *Garn.* 351.

BORAGO OFFICINALIS L. (2) Cheadle, *Garn.* 351. (3) Needwood; Lichfield; Burton, *Garn.*; garden weed at Barton, *Brown*, 268.

ANCHUSA SEMPERVIRENS L. (3) Acton, *Moore*; near Four Oaks, Sandwell Park.

Lycopsis arvensis L. Common amongst corn! *Garn.* 351.

PULMONARIA OFFICINALIS L. Needwood Forest, *Dr. Hewgill*, *Garn.* 350.

Myosotis cæspitosa F. Schultz. Common! *Garn.* 351.

M. palustris Relh. (2) Dovedale. (3) Near Stafford, *Douglas*; Weston-on-Trent; Kingston Pool; Tixall; Great Heywood, &c. (4) Arley Wood; Perton; Gornall.

b. *strigulosa* Mert. & Koch. (1) Lask Edge, Biddulph, *Painter*, 900 ft. (2) Rudyard Reservoir, *Painter*. (4) Trysull.

M. repens G. Don. (1) Overton Edge, 1000 ft.; Biddulph

Moor, *Painter*. (2) Horton, *Painter*. (3) Hawkesyard Park, *Reader*; Cannock Chase; Sherbrook Valley.

M. sylvatica Hoffm. Common in our woods? *Garn.* 351. (2) Manyfold Valley; Yarlet, *Fraser*; Warslow, *Dr. Parsons*; Rolleston, *Brown*, 269. (3) Near Stafford, *Douglas*. (2) With white flowers at Ramshorn, *Garn.* The plant I saw at Ramshorn was var. *umbrosa* of *arvensis*.

M. arvensis Lam. Common! *Garn.* 351.

b. *umbrosa* Bab. Abundant in places. (2) Ramshorn; Oakamore; Hanbury; near Sudbury. (3) Gnosall; Weston-on-Trent; Salt; Chartley. (4) Oulton; Arley and Coldridge Woods; Kinver.

M. collina Hoffm. Not rare on limestone, *Garn.* 351. (2) Wever Hill! *Brown*, 269. (4) Trysull, *Fraser*; Kinver; Swindon.

M. versicolor Reichenb. (1) Rushton Dingle. (2) Rudyard Reservoir, *Painter*. (3) Knypersley Pool, *Painter*; near Barr Beacon. (4) Seckley Wood.

Lithospermum officinale L. (2) Tutbury Castle, *Shaw*, 107; on the walls of Alton Castle, *Garn.* 350; near Cheadle, *Carter*, 1839. (3) Croxden Abbey; Burton, *Garn.*; Horningslow, *Brown*, 269. (4) Wren's Nest.

L. arvense L. Common, *Garn.* 350. (3) Wrottesley; Orton, *Fraser*; Chesterfield; Shenstone.

Echium vulgare L. (3) Stafford, *Shaw*, 103; Lichfield, *Garn.* 350; King's Bromley, *Moore*; Fradley Heath; near Colwich; Dudley Castle, *Shaw*, ii. 6. (4) Weston-under-Lizard, *Shaw*, 103; south of Wombourne; Kinver! *Garn.* 350; Trescott.

CONVOLVULACEÆ.

Volvulus sepium Junger. Common in hedges! *Garn.* 353.

Convolvulus arvensis L. Common in hedges, &c.! *Garn.* 353.

Cuscuta europæa L. Rare, but occurring occasionally; parasitical on nettles, flax, clover, *Garn.* 357.

C. Trifolii Bab. (3) King's Bromley, *Moore*.

SOLANACEÆ.

Solanum Dulcamara L. Common! *Garn.* 353.

S. nigrum L. (1) Betley, *Garn.* 353. (3) A weed at Hawkesyard, *Reader*; Lichfield; Burton, *Garn.*

Atropa Belladonna L. (2) Alton Castle Grounds, *Shaw*, 100; Alton Castle fosse, seen there by Mr. Kennade, 1896; Tutbury Castle, *Brown*, 270. (3) Barrow Hill, *Garn.* 353; near Lichfield, *J. Power*; banks of Dudley Castle! *With.*; there 1899. (4) Wren's Nest.

DATURA STRAMONIUM L. (3) Appears as a garden weed at Burton; Hawkesyard Priory, *Reader*.

Hyoscyamus niger L. (2) Waste places, Tutbury Castle, *Garn.* 353. (3) Near Tamworth, one mile on the Lichfield Road; Four Crosses; Streetway, Lichfield, *Garn.*; near Stafford, *Douglas*; Canwell, *Moore*; Shobnall marl-pits, *Brown*, 270.

SCROPHULARINEÆ.

Verbascum Thapsus L. (2) Dovedale! *Brown*, 270; Manyfold Valley, *Fraser*! near Alton; near Ramshorn. (3) Sinai Park, *Brown*, 270; Acton, *Moore*; near Stafford, *Douglas*; Hawkesyard, *Reader*; Stowe; Blithbury; Haughton; Gnosall; Tettensor; Sandwell; Little Perry. (4) Trysull, *Fraser*; Arley Wood,

V. Lychnitis L. (3) Burton, *Garn.* 353. (4) Common on hedge-banks at Wombourne, *Shaw*, ii. 6; Kinfare, near the rock houses! *Stokes*, *With.* 249; Whittington Common! *Fraser*; Arley Wood; near Enville.

V. nigrum L. (3) Betwixt Hamstead and Birmingham, *With.* 249; Perry Barr, *Garn.* 353. (4) Wombourne, *Garn.*

V. Blattaria L. (3) Hill Ridware, *Shaw*, 115. (4) Durnsley and Kinver, *Scott*, *Purt.* i. 127.

Linaria Cymbalaria Mill. (1) Gutter Lane, *Painter*. (2) On old walls, Mayfield, *Garn.* 386; Longnor, *N. S. S. Rep.* 91; Cotton; Oakamore; Dimmings Dale. (3) Burton, *Brown*, 270; ruins of Shugborough Old Hall; Lapley, *Garn.*; old walls, Stafford, *Moore*; Dudley Castle. (4) Sedgeley; Arley.

L. repens Mill. (3) Great Heywood, *Moore*; Hamstead railway cutting.

L. vulgaris Mill. Common in fields and hedges! *Garn.* 386.

L. viscida Moench. (3) Perry Barr canal-bank. (4) Amongst the wheat in the pit-down, Blymhill, *Garn.* 386.

ANTIRRHINUM MAJUS L. (3) On the walls of Rushall Castle, *Shaw*, 99; on Burton Abbey walls, *Garn.* 386.

A. Orontium L. (3) Burton, *Garn.* 386; Himley, *Bree*, *Purt.* i. 737.

Scrophularia aquatica L. Frequent. (2) Near Alton. (3) Tettenhall, *Fraser*; King's Bromley, *Moore*; near Stafford, *Douglas*; near Walsall, &c. (4) Enville.

S. UMBROSA Dum. Stafford, *Top. Bot.* 295.

S. nodosa Dum. Common.

MIMULUS LANGSDORFII Donn. (2) Ramshorn; Wever Hill; Star Wood, Oakamore. (3) Brook, Cannock, *J. Power*; boggy stream on Cannock Chase, near Rugeley, *Dr. Parsons*; abundant, Oxhill Lane, Sandwell.

Limosella aquatica L. (2) Rudyard Reservoir, *Purchas*. (3) Knypersley Reservoir, *Painter*; Stowe Pool, near Lichfield, *J. Power*; Harbourn Reservoir; Pottall Reservoir; Hayhead.

Digitalis purpurea L. Common! seldom found on limestone! *Garn.* 386; with (2) white flowers at Bagnall, *Garn.*

Veronica hederæfolia L. Common! *Garn.* 341.

V. polita Fr. Rare. (2) Near Alton Towers. (3) Cultivated field, Burton, *Brown*, 272; Newborough.

V. agrestis L. Common! *Garn.* 340.

V. Tournefortii C. Gmel. (2) Near Rudyard Railway Station, *Painter*; Hanbury; Marchington. (3) Near Burton, *Brown*, 272; Knypersley Hall, *Painter*; Codsall; Ingestre; Hixon; Hamstall-Ridware; Armitage, Gnosall, &c. (4) Trysull, *Fraser*; Oulton.

V. arvensis L. Common! *Garn.* 341.

V. serpyllifolia L. Common! *Garn.* 341.

V. officinalis L. Common! *Garn.* 340.

V. Chamædrys L. Common on banks! *Garn.* 340.

V. montana L. (2) Near Cheadle, *Carter*, 1839; Ramshorn; Oakamore; Alton. (3) Blithfield Park; Blithbury; Blithfield; Tixall; Ingestre. (4) Weston-under-Lizard, *Shaw*, 115; Baggeridge Wood; Arley Wood; Seckley Wood.

V. scutellata L. (2) North end of Rudyard Reservoir, *Painter*; near Cheadle, *Carter*, 1839. (3) Endon; Calf Heath; Whitmore; Lichfield, *Garn.* 340; Whittington Heath, *J. Power*; Needwood Forest, *Brown*, 271; ditches about Tamworth, *With.* 15; Blithfield Park! Armitage, *Reader*; Hopton Pool, Ingestre; Sherbrook; Drayton Bassett; Hints. (4) Weston-under-Lizard, *Garn.* 340; Oulton; Shelmore Wood.

V. Anagallis-aquatica L. Rather frequent.

V. Beccabunga L. Common! *Garn.* 340.

Euphrasia officinalis L. (1) Swithamley Valley. (2) Warslow; Alton. (3) King's Bromley, *Moore*; Streetley, Cannock Chase, &c. (4) Arley Wood, Oulton, &c.

Bartsia Odontites Huds. Common, *Garn.* 385.

Var. b. *serotina* Reichenb. Rather rare. (2) Road to Sudbury. (3) Chartley; near Weston-on-Trent. (4) Oulton, near Gnosall.

Pedicularis palustris L. (1) Betley, *Garn.* 387. (2) Near Alton. (3) Stoke Meadows; Kingsley, *Garn.*; Lichfield, *J. Power*; Chartley Moss! *N. S. S. Rep.* 86. (4) Oulton.

P. sylvatica L. Common on heathy places, *Garn.* 386. (2) Ramshorn. (3) Needwood Forest, *Brown*, 271; Walsall, Cannock, &c. (4) Enville.

Rhinanthus Crista-galli Huds. Common! *Garn.* 385.

R. major Ehrh. Not uncommon on peaty soils? *Garn.* 385. (2) Wetley; Ashley, *Garn.* 385. (3) Near Stafford, *Douglas* (Top. Bot. 292).

Melampyrum pratense L. Common in woods and on heaths! *Garn.* 386. (1) Swithamley. (2) Oakamore. &c. (3) Showls Wood, Kingston; Bagots Wood. (4) Arley and Coldridge Woods; Seckley.

Var. *montanum*. (1) Congleton Edge; Wickerstone Rocks, *Painter*.

OROBANCHACEÆ.

Orobanche major L. (1) Heyley Castle. *Garn.* 387. (2) On gorse and broom near Cheadle, *N. S. S. Rep.* 91. (3) Near Stafford, *Douglas*. (4) Bishop's Wood, *N. S. S. Rep.* 91; Blymhill, in the Pye Hill Lane, *Shaw*, 110.

O. elatior Sutton. (2) Near Cheadle, *Carter*, 1839.

Lathræa Squamaria L. (2) Woods below Castern, on both sides of the river; Caldon Lane, *Carter*; Manyfold Valley, *Fraser*; near Cheadle, on elder roots, *N. S. S. Rep.* 90. (3) By the side of Yoxall Brook, *Shaw*, ii. 7; Langley Meadows; King's Bromley; Woodford, *Garn.* 386; Dadley Dingle, near Walsall; Dudley Castle, on the elm, *Rev. F. J. Clark*. (4) Arley, *E. Lees*.

LENTIBULARIEÆ.

Utricularia vulgaris L. (1) Betley; Craddock Moss, *Garn.* 341. (2) Woodford, near Uttoxeter, *Brown*, 270. (3) Whitmore, *Garn.*; Catholme Meadows, *Brown*, 278; Huddersfield, near Lichfield, *J. Power*! (4) Blymhill; Aqualate, *Garn.*

U. neglecta Lehm. (4) Shelmore Wood, near Norbury.

U. minor L. (1) Craddock's Moss, *Garn.* 341; Betley, *Mrs. Acland*, *Purt.* iii. 5. (3) Chartley Moss; and Norton Bog, *Mr. Bagot*, *With.* 19.

Pinguicula vulgaris L. (2) At the foot of Axe Edge, *Garn.* 341. (3) Whittington Heath, *J. Power*; Cannock; Swanmington, *Brown*, 275. (4) Blymhill, *Shaw*, 101.

VERBENACEÆ.

Verbena officinalis L. (2) About Tutbury Castle, *Garn.* 387; Stowe, Lichfield, *Garn.*; near Stafford, *Douglas*; Tattenhill and Winshill, *Brown*, 275; Hopton, abundant.

LABIATÆ.

Mentha longifolia Huds. (3) By a ditch, Longdon, *Reader*. Var. 2. *villosa*. (2) Cheadle, *Shaw*, 109.

M. acutifolia. (2) Side of river, Oakamore, *Carter*, 1839.

M. viridis L. Common, but introduced, *Garn.* 383. (1) Under Heyley Castle bank, *Garn.*

M. piperita L. (3) Roadside at Boothen Clayton, &c., *Garn.* 383. (3) Brocton. (4) Oaken, *Fraser*.

M. hirsuta Huds. Very common! *Garn.* 383.

b. *subglabra* Baker. (3) Sherbrook Valley, &c.

c. *citrata* Ehrh. (3) Barton-under-Needwood, *R. Kirby Trimmer*; Trent-side, Wichnor, *Brown*, 272.

M. sativa L. In woods, occasionally. (2) Horton, *Painter*. (4) Seckley and Arley Woods.

M. rubra Sm. Occasional in rivers and wet places. (2) Onecote, *Garn.* 383. (4) Pool by Himley Wood; Severn banks by Seckley Wood.

M. arvensis L. (4) Blymhill, *Shaw*, 107; common in cornfields! *Garn.* 383.

M. Pulegium L. (1) Craddock's Moss. *Garn.* 383. (4) Blymhill, *Shaw*, 107.

Lycopus europæus L. (2) Marchington. (3) Knypersley, *Painter*; King's Bromley! *Moore*; Drointon; Farley; Stowe. (4) Lower Penn, *Fraser*; Oulton; Trysull.

Origanum vulgare L. (1) Heyley Castle, *Garn.* 101. (2) Croxden Abbey, *Garn.*; near Cheadle, *Carter*, 1839; Dovedale! *Fraser*; Tutbury Castle, *Garn.*; Cauldon Moor Lane to Ilam, *Shaw*, 101; Wever Hill.

Thymus Serpyllum Fr. Common, particularly on limestone, *Garn.* 383. (2) Wever Hill. (3) Ingestre; Sherbrook Valley. (4) Coldridge and Arley Woods.

Calamintha Clinopodium Spenn. (3) Near Stafford! *Douglas*; Hixon; Drointon; Chartley; Shirleywich, Hints, &c. (4) Wren's Nest! *Fraser*; Trysull, Arley, Oulton, &c.

C. arvensis L. "Common on limestone in the south of the county," *Garn.* 385. (2) Manyfold Valley; Dovedale! *Fraser*; Longnor, *N. S. S. Rep.* 91. (3) Near Stafford, *Douglas.* (4) Whittington Common.

Var. *flore-albo.* (2) Longnor, *Yates*, *N. S. S. Rep.* 91. (4) Kinver, *Garn.*

C. officinalis Moench. (1) Heyley, *Garn.* (2) Tutbury Castle, *Garn.* (3) Lichfield, *Garn.*; near Wolsey Bridge. *Shaw*, 107; near Stafford, *Douglas*; Hopton. (4) Dudley, *Garn.*; Dudley Castle! *Shaw*, ii. 6.

Salvia Verbenaca L. (2) Amongst the ruins of Tutbury Castle, *Shaw*, 112. (4) About Kinfare, plentiful, *Brunton*, *With.* 20.

Nepeta Cataria L. (1) Heyley Castle, *Garn.* 384. (2) Tutbury, *Brown*, 274; near Stafford, *Douglas*; Lichfield; Perry Barr! *Garn.*

N. Glechoma Benth. Common! *Garn.* 385.

Var. *hirsuta* R. (2) Uttoxeter; Marchington.

Scutellaria galericulata L. Common, *Garn.* (1) Flash. (2) Rudyard Reservoir, *Painter*. (3) King's Bromley! *Moore*; Knypersley, *Painter*; Fradley; Shirleywich, &c. (4) Trysull, *Fraser*; Oulton, &c.

S. minor Huds. (3) Near Swinnerton; Lichfield, *Garn.* 385; Sherbrook Valley. (4) Seckley Wood.

Prunella vulgaris L. Common! *Garn.* 385.

Marrubium vulgare L. (3) Near Lichfield, *Miss Jackson.* "I never saw it wild," *Garn.* 385.

Stachys Betonica Benth. Common! *Garn.* (1) The drive from Biddulph Hall, *Painter*. (2) Near Alton; Rolleston, *Brown*, 274. (3) King's Bromley! *Moore*; Chartley; Gnosall, &c. (4) Trysull! *Fraser*; Oulton; Arley; Arley Wood.

S. palustris L. (2) Oakamore. (3) Shobnal, *Brown*, 274; King's Bromley! *Moore*; Shirleywich; Weston-on-Trent; Drayton; Great Barr; Pipe-Ridware, &c. (4) Coldridge and Arley Woods, &c.

S. sylvatica L. Common! *Garn.* 384.

S. arvensis L. Common! *Garn.* 384. (2) Rolleston, *Brown*, 272. (3) King's Bromley! *Moore*; Blymhill, *Shaw*, ii. 7, &c.

S. annua L. Rare. (2) Near Cheadle, *Carter*, 1839.

Galeopsis Ladanum L. (2) Rocks in Dovedale, *Mr. Spark.* (3) In a bean-field between Stone and Stafford, 1839 and 1841, *Garn.* 384.

G. versicolor Curt. (2) Draycote, *Carter*, 1839. (3) Burton, *Brown*, 274; Fradley Heath, *J. Power*; near Stafford, *Douglas.* (4) Blymhill, *Shaw*, 101.

G. Tetrahit L. Common! *Garn.* 384.

Leonurus Cardiaca L. (3) A narrow shady lane at the back of Barr Park, Ick, *Garn.* (4) Gornal Wood, *Shaw*, ii. 6.

Lamium amplexicaule L. (1) Betley, *Garn.* 384. (3) Cotonfield, Stafford, *Moore*; Burton, *Brown*, 274; near Colwich. (4) Kinver, *Garn.*

L. hybridum Vill. (3) Stoke, *Garn.* 384; near Stafford, *Douglas.*

L. purpureum L. Common, *Garn.* 384.

L. maculatum L. (1) Rushton Spencer, *Painter.* (3) Naturalized in shrubberies, Burton, *Brown*, 274; Perry Barr.

L. album L. Common! *Garn.* 384.

L. Galeobdolon Crantz. (1) Biddulph, *Painter.* (2) Alton. (3) Near Stafford, *Douglas*; Chartley; Colton; Tixall; Gnosall; Fradley; Lichfield, &c. (4) Stewponey; Kinver, &c.
Var. *flore albo.* (3) Near Salt.

Teucrium Scorodonia L. Common! *Garn.* 383.

Ajuga reptans L. Common! *Garn.* 383.

PLANTAGINEÆ.

Plantago major L. Common, *Garn.* 349.
b. *intermedia* Gilib. (2) Rudyard. (3) Knypersley, *Painter.*

P. media L. Common? on marl or limestone, *Garn.* 349. (2) Foxt, near Froghall; Manyfold Valley; Walton; Wever Hill. (3) Stafford, *Douglas*; Pyre Hill, Stone, *Moore*; Hayhead. (4) Sedgeley.

P. lanceolata L. Common, *Garn.* 349.
b. *Timbali* Reichenb. (3) Churchyard, Rugeley, *Reader.*

P. Coronopus L. (2) Near Cheadle, *Carter*, 1839; Ramshorn. (3) Trentham, *Garn.* 349; Branston and Barton; Walton Lane, *Brown*, 276; Cannock. (4) Near Swindon.

Littorella juncea Berg. (2) Rudyard Reservoir, *Garn.* 406. (3) Trentham Pool! Calf Heath; Hednesford Pool, *Garn.*; Knypersley Reservoir, *Painter*; Cannock Chase! *Brown*, 276; Gailey Reservoir.

ILLECEBRACEÆ.

[*Illecebrum verticillatum* L. (3) On the roadside between Elnal and Ranton Abbey, *With.* 263. Error?]

Scleranthus annuus L. General? *Garn.* 370. (1) Biddulph, *Painter.* (3) Cornfields, Rugeley; and Armitage, *Reader*; Tixall Heath; Cannock Chase. (4) Swindon.

CHENOPODIACEÆ.

Chenopodium polyspermum L. (3) Anslow, *Brown*, 277. (4) Waste land by Himley Wood.

b. *cymosum* Moq. (4) Waste land by Himley Wood.

C. Vulvaria L. (3) Between Burton and Branston, *Brown*, 276.

C. album L. Common! *Garn.* 360.

C. rubrum L. (4) Waste land, Himley; Gornal Wood.

C. urbicum var. *intermedium* Moq. (3) By the road at Branston near Burton, *Garn.* 360. (4) Blymhill Churchyard, *Shaw*, 102.

C. Bonus-Henricus L. (2) Rudyard, *Painter*; Tutbury. (3) Branston, *Brown*, 277; Stoke-on-Trent, *Garn.* 360; Castle Woods, Stafford, *Moore*; Marvesyn-Ridware, *Reader*; near Kingston. (4) Wightwick; Perton.

Atriplex patula L. Common! *Garn.* 406.

c. *angustifolia* Sm. (3) Near Knypersley Hall, *Painter.*

A. hastata L. (1) Common cinderbank, Childer Play, *Painter.* (3) Burton, *Brown*, 277; near Lichfield.

POLYGONACEÆ.

Polygonum Convolvulus L. Common! *Garn.* 368.

P. aviculare L. Common! *Garn.* 368.

c. *arenastrum* Bor. (3) Queslet. (4) Gornal Wood; Swindon; Himley.

P. Hydropiper L. Common! *Garn.*

P. minus Huds. (3) Wolstanton, *Garn.*; Burton; Walton End, Ingleby, *Brown*, 278; Branston, *Nowers*, 91.

P. Persicaria L. Common! *Garn.* 368.

P. lapathifolium L. Common! *Garn.*

P. maculatum Trim. & Dyer. Rare. (3) Near Colwich.

P. Bistorta L. Local. (2) Near Cheadle, *Carter*, 1839. (3) Yoxall Park, *Riley*, *Shaw*, ii. 7; near Bentley Brook, Cannock.

P. amphibium L. Rather frequent.

b. *terrestre* Leers. Rare or overlooked. (3) Hayhead. (4) Perton Pool and Reservoir.

Fagopyrum esculentum Moench. Escape. (2) Cheadle, *Carter*, 1839. (3) Hints.

Rumex conglomeratus Murr. Common! *Garn.* 365.

R. sanguineus L. Not rare? *Garn.* 365. (2) Cheadle, *Shaw*, 112.

b. *viridis* Sibth. (2) Rudyard Reservoir, *Painter.* (3) Knypersley Park, *Painter.*

R. maritimus L. (3) Near Stafford, *Douglas*; Poole Hall, *Fraser*; Hopton Pool, Dam of Kingston Pool! *Garn.* 365; Horninglow, *Brown*, 277; near Branston, *Nowers*; Tettenhall. (4) Snowdon Pool; Foucher's Pool, Swindon.

R. pulcher L. (2) Near Cheadle, *Shaw*, 112. (3) Near Stafford *Douglas*; Stoke-upon-Trent, *Garn.* 365.

R. limosus Thuill. (3) Stafford; Burton, *Garn.* 365.

R. obtusifolius L. Common! *Garn.* 365.

b. *sylvestris* Wallr. (2) Rolleston, *Bloxam.*

R. crispus L. Common! *Garn.* 365.

R. Hydrolapathum Huds. Common! *Garn.* 365. (2) Near Oakamore. (3) Knypersley Hall, *Painter*; Wichnor, *Shaw*; Kingston, *Fraser*; Stafford, *Douglas*; widely distributed over Trent basin. (4) Oulton; Himley, &c.

R. ALPINUS L. (2) Near Harracles Mill, Rudyard, alien, *Painter*; between Leek and Longton, millstone grit, *Dr. Parsons*!

R. Acetosa L. Common! *Garn.* 365.

R. Acetosella L. Common! *Garn.* 365.

THYMELÆACEÆ.

Daphne Mezereum L. (2) Thickets, Dovedale, and near Byrkley Lodge, *Brown*, 278. (3) Needwood Forest, *Pitt*, *With.* 370.

D. Laureola L. (2) Near Uttoxeter, *Garn.* 368; Marchington Cliffs; Beaumanor, *Brown*, 278. (3) Needwood Forest, *Pitt*, *With.* 371; there in 1893, *N. S. S. Rep.* 93; near Stafford.

A variety with variegated leaves is recorded by *Pitt* from Needwood Forest, *With.* 371.

LORANTHACEÆ.

Viscum album L. (2) Rolleston Gardens, introduced, *Brown*, 287. (3) Needwood, *Dr. Hewgill*. (4) On the apple or thorn about Upper Arley, *Garn.* 414.

EUPHORBIACEÆ.

Euphorbia Helioscopia L. Common! *Garn.* 404.

E. amygdaloides L. (2) Abundant near Forest Church, Needwood, *Garn.*; Star Wood, Oakamore; road to Sudbury. (3) Needwood Forest, *Carter*, 1839; Bagots Park! King's Standing; Burton, *Garn.* 405; Hoar Cross and Yoxall. (4) Seckley Wood; Coldridge Wood, &c.

E. Characias L. "What I think is this, in a hedge between (3) Newborough and Forest Church; Heywood Park, *Ray*; Needwood," *English Flora*, iv. 29.

E. Cyparissias L. (4) Enville, *With.* 443.

E. Peplis L. Common! *Garn.* 404.

E. exigua L. Common! *Garn.*

Buxus sempervirens L. (1) Biddulph Hall, *Painter*. Occasional as an escape in several places.

Mercurialis perennis L. Common! *Garn.* 415.

URTICACEÆ.

Ulmus montana Stokes. Common! *Garn.* 360.

U. surculosa Stokes. Common! *Garn* 361.

Humulus Lupulus L. Frequent! *Garn.* 414. (2) Near Alton; (3) Near Rugeley! *Reader*; King's Bromley! *Moore*; frequent in the Trent Valley. (4) Lower Penn! Perton! *Fraser*, &c.

Urtica dioica L. Common! *Garn.* 407.

U. urens L. Common, *Garn.* 407. (3) Netherton, near Rugeley. (4) Wombourne; Penn; Chase Pool; Smestow; Swindon.

Parietaria officinalis L. (2) Croxden Abbey; Tutbury! *Garn.* 349. (3) Burton-on-Trent, on the Abbey-walls, *Shaw*, 110; Lichfield Minster, *J. Power*, 1815; old walls, Lichfield; Stowe; Hints; Canwell, &c. (4) Old walls, Upper Arley, abundant.

MYRICACEÆ.

Myrica Gale L. (4) Forton; Aqualate Mere! Moreton Moors, abundant, *Shaw*, 107; abundant, Norbury Big Moss and moorlands near Norbury.

CUPULIFERÆ.

Betula verrucosa Ehrh. (1) Trough Stones. (3) Near Knypersley Pools, *Painter*; Gailey, &c.

B. pubescens Ehrh. (1) Road to Lask Edge; Rushton, *Painter*. (3) Gailey; Little Aston; Four Ashes. Both species frequent, but not properly discriminated.

Alnus glutinosa Medic. Common about rivers, &c.! *Garn.* 407.

Carpinus Betulus L. (2) Barlaston Common, *Fraser*. (3) Stone, *Moore*; Armitage, *Reader*; some fine trees at Bagnall, *Garn.* 411; Blithfield; Shugborough; Barr Park, &c.

Corylus Avellana L. Common! *Garn.* 411.

Quercus Robur L. a. *pedunculata* Ehrh. Common.

b. *intermedia* D. Don. (4) Seckley, *Fraser*.

c. *sessiliflora* Salisb. (1) Spring Coppice and other places, Biddulph, *Painter*; Sandon; Swinnerton! *Garn.* 410; near Stafford, *Douglas*; Great Barr; Sandwell. (4) Himley; Kingswinford! *Garn.*

Castanea* **sativa** Mill. Common, planted? *Garn.* 411. Abundant, apparently self-set, in Pottal Slade near Teddesley, &c.

Fagus sylvatica L. Common.

SALICINEÆ.

Salix triandra L. (3) Pendeford! *Fraser*; in osier-beds below Stoke-on-Trent, *Garn.* 411; Burton, *Brown*, 281; near Colton.

b. *Hoffmanniana* Sm. Pendeford Mill; Bilbrook! *Fraser*; near King's Bromley.

+ *alba* (*undulata* Ehrh.). (3) Near Knypersley Pools, *Painter*; Trysull Mill, *Fraser*!

S. pentandra L. (1) Lask Edge, 800 ft. (3) Below Knypersley Mill, *Painter*; abundant, moorlands, Handford Bridge, *Garn.* 411; near the East Gate, Stafford, *Stokes*; plantations at Mr. Bolton's, Soho! *With.* 46; Kingston Pool, near Little Aston; Baswich; Bilbrook.

S. undulata Ehrh. (4) Trysull, *Fraser*.

S. fragilis L. (3) Trent Valley, above Stoke, *Garn.* 411; Kingston Pool; near Lichfield; Cannock; Milwich; Fradswell. (4) Arley.

b. *britannica* F. B. White (*S. Russelliana* auct.). (1) Biddulph, *Painter*. (3) Stoke meadows, *Garn.* 411; Bilbrook! *Fraser*; Abbott's Bromley. (4) Near Norbury Park; Himley Wood.

S. alba L. (2) Uttoxeter, *Garn.* 413; Coton-in-Clay; near Sudbury. (3) Sandwell. (4) Himley; Upper Arley.

b. *vitellina* L. (1) Biddulph Hall, planted, *Painter*. (3) Tettenhall, *Fraser*! near Hamstall-Ridware; near Armitage, Milwich.

+ *fragilis* (*viridis* Fries). (4) Near Norbury Park.

S. purpurea L. (2) North end of Rudyard Reservoir, *Painter*; near Coton-in-Clay. (3) Bilbrook, *Fraser*; Little Aston Mill.

f. *Woolgariana* (Borr.). (4) Snowdon Pool, Patsull, *Fraser*; Trysull.

f. *Lambertiana* (Sm.). (3) Little Aston Mill Pool.

+ (*viminalis*) *rubra* Huds. (3) Bilbrook, *Fraser*.

f. *Forbyana* (Sm.). (3) Codsall, *Fraser*.

S. viminalis L. (2) Near north end of Rudyard Reservoir, *Painter*; Alton Towers; Coton. (3) Handford, *Garn.* 413; near Knypersley Pool, *Painter*.

+ *Caprea* (*Smithiana*) Willd. (3) Bilbrook, *Fraser*; Kingston Pool; Mill Pool, Lichfield; Blithbury.

S. rugosa Leefe. (3) Knypersley, *Painter*. (4) Stewponey, *Fraser*.

+ SMITHIANA? *acuminata* Sm. (1) Madeley, *Garn.* (2) Coton-in-Clay. (3) Tettenhall, *Fraser*; Pendeford. (4) Blymhill, *Shaw*, 112; Trysull, *Fraser*.

S. sericans? Tausch. Near Knypersley Pools, *Painter*.

S. Caprea L. Common in hedges! *Garn.* 413.

S. aurita L. (2) Road to Sudbury, lane by Forest Banks. (3) Needwood, *Brown*; Codsall; Pendeford, *Fraser*; Grindley; Stonnall; Wall; Little Aston.

+ *cinerea* (*lutescens*) A. Kern. Near Wickerstone Rocks, *Painter*.

S. cinerea L. (3) Frequent, Trent meadows! *Garn.* 413; Trentham; Armitage; Abbot's Bromley; Blithbury; Little Aston.

b. *aquatica* Sm. (3) Common about the Trent! *Garn.* 313; Armitage; Grindley.

Var. *oleifolia*. (3) Little Aston; Armitage.

+ *phylicifolia* (*laurina*) Sm. (4) Trysull Dingle, *Fraser*.

S. repens L. (2) Footway from Bishop's Hill to Sudbury. (3) Sherbrook Valley, &c.

Populus alba L. (1) Betley, *Garn.* 414. (3) Knypersley Reservoir, *Painter*; Stowe (near Lichfield); Stafford, *Garn.*; Teddesley; Sandwell; Hamstead; Barr. (4) Wightwich.

P. canescens Sm. (3) Handford Bridge, *Garn.* 414; Pendeford; Stonnall; Hoare Cross. (4) Hinksford.

P. tremula L. Common in the moorlands! *Garn.* (1) Biddulph, *Painter*. (3) Congleton Edge, Knypersley, *Painter*; Hints; Weeford; Norton, &c. (4) Trysull! *Fraser*.

P. nigra L. Common? *Garn.* 415. (2) North end of Rudyard, *Painter*. (3) Splendid trees at Gayton. (4) Near Wood Eaves; near Himley.

EMPETRACEÆ.

Empetrum nigrum L. (1) Craddock's Moss, *Fraser*; near Ludschurch. (2) Rudyard, *Painter*; near Cheadle, *Carter*, 1839. (3) Cannock Chase! *Shaw*, 103! Chartley Moss! *N. S. S. Rep.* 86; Sherbrook Valley; Norton Bog and Reservoir, Hednesford.

CERATOPHYLLEÆ.

Ceratophyllum demersum L. Common in all our streams and pools?? *Garn.* 407. (1) Betley; near Stafford, *Douglas*; pool near Fradley; Sherbrook Valley. (4) Perton Pool and Reservoir; Trysull.

CONIFERÆ.

Juniperus communis L. Old trees, frequent about old houses, *Garn.* 405.

Taxus baccata L. (2) Wild on limestone rocks near Dovedale. (3) Tixall! Caverswall. (4) Himley! *Garn.* 415.

Pinus sylvestris L. Frequent! flourishes well in bogs, *Garn.* 411.

HYDROCHARIDEÆ.

ELODEA CANADENSIS Michx. Common. Pools, streams, and canal.

Hydrocharis Morsus-ranæ L. (1) Balterley, *Garn.* 415! marsh near Madeley, *Fraser*. (4) Aqualate, *Garn.*

Stratiotes aloides L. (1) Field near Madeley, *Fraser*!

ORCHIDEÆ.

Neottia Nidus-avis Rich. (2) Manyfold Valley. (4) Sedgeley; Penn, *Fraser*.

Listera ovata R. Br. (2) Near Cheadle, *Carter*, 1839. (3) Hamstall-Ridware, *Shaw*, ii. 7; Chartley! *N. S. S. Rep.* 86; King's Bromley, *Moore*; Tixall; Gnosall; Hayhead, &c. (4) Blymhill, *Shaw*, 110; Norbury.

Spiranthes autumnalis Rich. (4) Meadows at Kingswinford, *Bree*, *Purt.* iii. 378.

Cephalanthera ensifolia Rich. (4) Moors near Moreton, *Shaw*, 113.

Epipactis latifolia All. (2) Near Cheadle, *Carter*, 1839. (3) Barlaston, *Shaw*, 113; Pipe Marsh, *Shaw*, ii. 7; Stafford Castle; Somerford, *Fraser*; Knypersley Park, *Painter*; Tillet's Rough, near Walsall. (4) Weston-under-Lizard, *Shaw*, 113.

E. palustris Crantz. (3) Meadows at the foot of Barr Beacon, *Ick*, *Analyst*. (4) Moors near Moreton, *Shaw*, 113; Fair Oak, *Garn.* 404.

Orchis pyramidalis L. (2) Manyfold Valley, *Fraser*; plantations near Uttoxeter; Catholin Lane. (3) Barton, *Dr. Hewgill*, *Garn.* 403.

O. ustulata L. (4) Kingswinford, *Bree*, *Purt.* iii. 378.

O. Morio L. (3) Chesterfield, *J. Power*; Barr Park. (4) Near Coldridge Wood! *Fraser*; Arley; Oulton; Shelmore Wood.

O. mascula L. (1) Biddulph, *Painter*. (2) Near Cheadle, *Carter*. Marchington Woodlands, Oakamore. (3) Hayhead. (4) Dudley Castle.

O. latifolia L. (2) Froghall, *Garn.*; near Cheadle, *Carter*, 1839. (3) Between Hamington and Shobnall, *Brown*, 284; Knypersley Park, *Painter*; Barlaston; Kingston Pool! Blazing Star, *Garn.*; Chartley! *N. S. S. Rep.* 86. (4) Compton.

O. maculata L. Common! *Garn.* 403. (2) Oakamore; Marchington. (3) King's Bromley, *Moore*; Cannock, Sherbrook Valley, &c.

Ophrys apifera Huds. (3) Yoxall Lodge. (4) Wren's Nest, *Rev. F. F. Clark*.

Habenaria conopsea Benth. (2) Grindon; Caldon; Waterhouses, *Garn.* 403; near Calton, *Shaw*, 110; near Cheadle, *Carter*, 1839. (3) Farley; Barr Beacon, *Garn.*; near Barr Beacon, *Wood*; Tillet's Rough, near Walsall. (4) Cradley Park, *Scott*, *Purt.* i. 473.

H. viridis R. Br. (1) Swithamley, *Garn.* 404. (2) Wetley; Froghall; Longnor; Cheadle, *Garn.*; near Wall Grange, *N. S. S. Rep.* 91. (3) Moddershall; Barlaston; Needwood, *Garn.* (4) Blymhill, *Shaw*, 112; Willowbridge, *Garn.*; Kingswinford, *Bree*.

H. albida R. Br. (4) ? Cradley Park, *Garn.* 404.

H. bifolia R. Br. (2) Wever Hills, *J. Gibson*, *Shaw*, 114; near Cheadle, *Carter*, 1839; near Wall Grange, *N. S. S. Rep.* 93. (3) Darlaston, near Stone, *Forster*, *Shaw*, 114; Tillet's Rough, near Walsall. (4) Blymhill, *J. Gibson*, *Shaw*, 114; woods at Enville, *With.* 21.

H. chloroleuca Ridley. (1) Drive from Biddulph Grange. (2) Near Rudyard Reservoir, *Painter*; Manyfold Valley, *Fraser*. (3) Lichfield, ? *Miss Jackson*, *Garn.*

IRIDEÆ.

Iris Pseudacorus L. Common in wet places! *Garn.* 342.

CROCUS VERNUS All. Occasionally in Trent meadows near Burton, *Brown*, 285.

C. NUDIFLORUS Sm. (3) Shut End, *Bree*, *Purt.* iii. 7; abundant in a field at Wolstanton and two other fields near, *Garn.* 343; Biddulph, *Painter*.

AMARYLLIDEÆ.

Narcissus Pseudo-Narcissus L. (1) Biddulph, *Painter*. (2) Hill Chorlton; Eaves Lane; Bagnall, *Garn.*; near Cheddleton, *N. S. S. Rep.* 93. (3) Abundant, Stoke meadows; Stanley; Hill Chorlton; Ashley; Lichfield; Burton, *Garn.*; between Farewell and Longdon, *J. Power*; King's Bromley! *Moore*. (4) Abundant, Willowbridge; Mucclestone, *Shaw*, 109.

N. BIFLORUS Curtis. (3) Near Croxall, *J. Power*.

N. POETICUS L. (3) Near Longdon Hall, *J. Power*; near Sandborough, *Garn.* 363.

GALANTHUS NIVALIS L. (2) Checkley; Castern. (3) Norton; Eaves Lane, *Garn.* 363; near Lichfield, *J. Power*; formerly at Shobnall plantation; Burton meadows, *Brown*, 285; Oaken meadows, *Fraser*.

DIOSCOREÆ.

Tamus communis L. Common, *Garn.* 414.

LILIACEÆ.

Polygonatum multiflorum All. (2) Belmont, *Sneyd*, *Shaw*, 102. (3) Needwood Forest, *Shaw*, ii. 7.

Convallaria majalis L. (2) Woods at Belmont, *Sneyd*, *Shaw*, 102; Dovedale; Wetton Valley, *Garn.* 364. (3) Curborough Wood, near Lichfield; Needwood Forest, *Gibson*, *Shaw*, 102; Rough Park Wood; Yoxall, *Garn.*; Chartley, *N. S. S. Rep.* 86; Showles Wood.

Allium vineale L. (2) On limestone rocks at Wetton Mill and Beeston Tor, *Garn.* 364.

A. oleraceum L. (2) On a rock, Wetton Valley. (3) In St. Chad's Churchyard, Lichfield, *Garn.* 364.

A. ursinum L. Common about rivers, brooks, and in woods.

Scilla festalis Salisb. Common! *Garn.* 364.

Fritillaria Meleagris L. (2) Uttoxeter, *Garn.* 364. (3) In a meadow from Wolsey Bridge to Stafford, *Shaw*, 105; Wheaton Aston, *Garn.* (4) In a meadow near Blymhill, *Dickenson*, *With.*

TULIPA SYLVESTRIS L. Near Statfold Hall, *Garn.* 364.

Colchicum autumnalis L. (3) Burton; Weston Park; Marston; Barr, *Shaw*; Stoke-on-Trent, *Garn.* 365; field near Walsall; Handsworth Church fields. (4) Blymhill, Dudley Old Park; Foremark, *Shaw*; Lower Penn, *Fraser*.

Narthecium Ossifragum Huds. (1) Flash. (2) Cotton and Whiston, *Carter*, 1839; Leek and Warlow! *Fraser*. (3) Ashley; Lichfield, *Garn.* 364; bogs, Cannock Chase! *Brown*, 287; Chartley Moss! Sherbrook Valley; Norton Bog. (4) Willowbridge, *Garn.*

Paris quadrifolia L. (2) Near Cheadle, *Carter*, 1839. (3) Darlaston, near Stone, *Forster*; Pendeford, *Shaw*, 110; near the pumping engine, Lichfield; wood near Fisherwick, *J. Power*; Chartley! *N. S. S. Rep.* 86. (4) Lord Bradford's Park, Weston-under-Lizard, *Forster*; near Gospel Oak End, *Shaw*, ii. 6; Baggeridge Woods! *Fraser*; Enville.

JUNCACEÆ.

Juncus bufonius L. Common, *Garn.* 364.

J. squarrosus L. On all our heaths, &c.! *Garn.* 365.

J. Gerardi Loisel. Kingston Pool, *Garn.*; not there in 1897; canal-bank, Shobnall; between Tutbury and Burton; Braunston, near the Trent, *Brown*, 287.

J. glaucus Leers. Common! *Garn.* 364.

J. effusus L. Common! *Garn.*

J. conglomeratus L. Common! *Garn.*

J. supinus Moench. Common! *Garn.*

J. obtusifolius Ehrh. (3) Burton; Scropton, *Brown*, 287.

J. lamprocarpus Ehrh. Common! *Garn.* 384.

J. acutifolius Ehrh. Common! *Garn.* 364.

Luzula Forsteri DC. (2) Dimmings Dale, *Dr. Hewgill*; "I have looked for it there in vain!" *Garn.* 365.

L. vernalis DC. Common in woods! *Garn.*

L. maxima DC. (1) Biddulph, *Fraser.* (2) Star Wood, Oakamore. (3) Coton Hall; Burnt Wood, *Shaw*, 106; Dingle near Knypersley Pools, *Painter*; Oulton Mill, near Stone; Kingston Wood. (4) Arley and Coldridge Woods.

L. campestris DC. Common! *Garn.* 365.

L. erecta Desv. Frequent. (2) Star Wood, Oakamore. (3) Pipe Marsh. (4) Norbury Big Moss.

Var. *congesta*. Frequent. (2) Oakamore. (3) Knypersley, *Painter.* (4) Norbury Big Moss.

TYPHACEÆ.

Typha latifolia L. Common! *Garn.* 405. (1) Pond near Moor House, Biddulph, *Painter.* (2) Oakamore. (3) Kingston Pool! *Fraser*; Little Aston; Fradley; Hayhead. (4) Himley Wood, &c.

T. angustifolia L. (1) Betley; Balterley, *Garn.* (2) Pool near Rolleston. (3) Copmere Pool; Whitmore; Kingston Pool! *Garn.*; near Stafford, *Douglas*; near Lichfield, *J. Power*; pool near Chartley House, *Bagot*, *With.* 112; Needwood Forest, *Brown*, 289; Little Bosses; Shirleywich. (4) Aqualate! *Garn.*; Lower Penn, *Fraser*; Oulton; Shelmore Wood; Himley.

Sparganium ramosum Huds. Common in ditches! two varieties! *Garn.* (1) Biddulph, *Painter.* (2) Rudyard, *Painter.* (4) Bishop's Wood and Kidmore Green, *Shaw*, 114.

Var. b. *microcarpon* Neuman. (2) Near Harracles Mill, *C. Bailey.*

S. neglectum Beeby. (1) Rushton. (2) Rudyard, *Bailey*; Alton. (3) Pool near Kingston; pool near Ingestre; Hayhead. (4) Norbury Park.

S. simplex Huds. (2) Near Alton. (3) Knypersley, *Painter*; Blithbury; Kingston; Little Bosses. (4) Pitmore Pool; Weston-under-Lizard, *Shaw*, 114; Oulton.

S. affine Schnizl. (3) Lime-pits, Whitmore, *Garn.* 405; near Mortiboy's field, Codsall, *Fraser.* (4) North side of Aqualate, *Shaw*, 114.

S. minimum Fr. (3) Ditches, Bagot's Park, *Brown*, 289; Enville Common, *Fraser.*

AROIDEÆ.

Arum maculatum L. Common in groves and hedges! *Garn.* 408.

ACORUS CALAMUS L. (1) Betley. (3) Longton; Tamworth, *Garn.* 364; near Lichfield, in a pond, in fruit, *J. Power*; Burton, *Brown*, 289; Maer Pool, *Yates*, *N. S. S. Rep.* 88.

LEMNACEÆ.

Lemna trisulca L. Common! *Garn.* 341. (2) Alton Towers. (3) Near Stafford, *Douglas*; near Burton, *Brown*, 289; Tixall; Hopton Pool; Sherbrook; Great Heywood, &c. (4) Wolverhampton and Trysull, *Fraser*.

L. minor L. Common! *Garn.*

L. gibba L. Common? *Garn.* (3) Copmere, *Garn.*; near Stafford, *Douglas*; near Hopwas, in a ditch, *J. Power*; ponds near Armitage, *Reader*; Tixall Pool; Gailey Reservoir. (4) Pool, Blymhill Lawn, *Shaw*, 107.

L. polyrrhiza L. (3) Copmere, *Garn.*; Brewood, *Shaw*, 107; near Stafford, *Douglas*; Tixall Pool; Hopton Pool; pool near Milwich. (4) Between Kidmore Green and Bishop's Wood, *Shaw*, 107.

ALISMACEÆ.

Alisma Plantago-aquatica L. Common in ditches! *Garn.* 366. b. *lanceolata* Afz. (3) Parkfield, *Fraser*; pool at Teddesley; Gailey Reservoir; Hopton Wood and Pool. (4) Swindon; near Himley Wood.

A. ranunculoides L. (3) Marl-pits at Fradley, *J. Power*; Cannock Chase, *Brown*, 288; Burton, *Garn.* 366; Knightley Common, *Forster*. (4) Motty meadows, Blymhill, *Shaw*, 99; Aqualate, Forton, *Garn.*

Sagittaria sagittifolia L. (2) Cheadle, *Carter*, 1839. (3) Burton-on-Trent, *Shaw*, 112; near Stafford, *Douglas*; Newcastle, Trent and Caldon canals near Stoke-upon-Trent; Foul Hay Brook; Tamworth, *Garn.* 407; near Weston-on-Trent; Shirleywich; Milford, &c. (4) Canal near Stourton.

Butomus umbellatus L. (3) Rickerscote, near Stafford! *Shaw*, 100; Tamworth, *With.* 386; near Stoke; Trentham Pools! Bridgeford; Burton; Repton; Needwood; Lichfield; Stretton, *Garn.* 369; Trent near Armitage! *Reader*; King's Bromley! *Dr. Parsons*; Shirley; Milford; Great Heywood; Colwich.

NAIADACEÆ.

Triglochin palustre L. Common in wet places? *Garn.* 365. (2) Near Cheadle, *Carter*, 1839. (3) Tamworth, *With.* 352; Hill Ridware, *Reader*. (4) Blymhill, *Shaw*, 114; Aqualate! *Fraser*; marshy field, Oulton.

T. maritimum L. (3) Salt-marsh at Tixall, *Mr. Wolseley*, *Shaw*, 114; marsh near Ingestre, *Stokes*, *With.* 352; Branston meadows, *Brown*, 288.

Potamogeton natans L. Common! *Garn.* 349. (1) Biddulph Common, 900 ft., *Painter.* (3) Knypersley Park, *Painter*; Chillington, *Fraser*; Gnosall; Hopton Pool; Hayhead, &c. (4) Foucher's Pool; Perton Reservoir, &c.

P. polygonifolius Pourr. (2) Small pool near Oakamore. (3) Cannock Chase! *Brown*, 284; Codsall! Stafford! Hopton Pool; Canwell.

P. alpinus Balb. (1) Pond, Biddulph Valley, *Painter.* (3) Canal-feeder below Knypersley Mill, *Painter.* (4) Trysull, *Fraser.*

P. heterophyllus Schreb. (4) Forton Pool, *Garn.* 350.

P. lucens L. Common! *Garn.* 349. (3) Near Stafford, *Douglas*; common in the Trent! *Brown*, 289; canal, Fradley; Trent, near Armitage. (4) Pool Hill Pool, *Fraser*; Perton Reservoir.

P. prælongus Wulf. (3) Near Burton, *Brown*, 290; near Stafford, *Douglas* sp. *Top. Bot.* 418.

P. perfoliatus L. Common! *Garn.* 349. Common, canals and River Trent.

P. crispus L. (3) Canals at Stoke; Trentham Pool! *Garn.* 350; near Stafford, *Douglas*; canals, Fradley; Colwich, Ingestre; frequent in Trent; Gailey, &c. (4) Near Swindon; Foucher's Pool, &c.

b. *serratus* Huds. (3) Near Croxall; near Alrewas.

P. densus L. Common? *Garn.* 349. (2) Near Mayfield (the only locality in which I have seen it).

P. zosteræfolius Schum. *P. compressum* L. (3) Canals at Stoke, *Garn.* 349; Trent at Barton, *Brown*, 290; near Stafford, *Douglas*; canal, Fradley; reservoir, Gailey; streams near Barton Railway-station. (4) Blymhill Lawn, in the second pool, *Shaw*, ii. 11.

P. obtusifolius Mert. & Koch. (3) Knypersley Pools, *Painter*, 95.

P. Friesii Rupr. (3) Canal, Fradley.

P. pusillus L. (2) Rolleston Ponds, *Brown*, 290. (3) Knypersley Pool, *Miss Thompson*; near Wolverhampton; Rough Hill, *Fraser*; canal, Gnosall; canal, Fradley.

P. trichoides Cham. (3) Pendeford? *Fraser.*

P. pectinatus L. (2) Rudyard Reservoir, *Painter.* (3) In canals, Stoke, *Garn.* 349; Knypersley Pool, *Miss Thompson*; canals, Weston; Milford, Colwich; Fradley; Great Barr, &c. (4) Forton Moors, *Shaw*, 111.

P. interruptus Kit. (3) Stafford, *Fraser*; Trent at Burton, *Brown*, 290; canals, Great Heywood; Weston-on-Stour; Hayhead. (4) Near Stewponey! *Fraser.*

P. filiformis Nolte. (3) Copmere Pool, *N. S. S. Rep.* 94.

Zannichellia palustris L. (3) On the stream at Stretton, and in the river at Tamworth, *Garn.* 405; near Stafford! *Douglas*; near Burton, *Brown.* (4) Staffordshire canals near the Stone bridge at Ketley; near Kingswinford, *F. A. Lees.*

CYPERACEÆ.

Eleocharis acicularis R. Br. Common? *Garn.* 343. (3) Sherbrook Valley. I have never met with this elsewhere in the county.

E. palustris R. Br. Common! *Garn.*

E. multicaulis Sm. Common? *Garn.* (3) Betwixt Shugborough and Brocton, *J. Power*! I have not seen this in the county.

Scirpus pauciflorus Lightf. (3) Chartley Bog, *Brown*, 271.

S. cæspitosus L. Common? *Garn.* 343. (1) Wickerstone rocks, *Painter*. (3) Cannock Chase! *Brown*, 291; Norton Bog and Norton Common; probably abundant on the moorlands in the north.

S. fluitans L. Common? (1) Craddock's Moss, &c., *Garn.* 343. (3) Cannock Chase; Norton Bog; Sherbrook Valley. (4) White Sitch Pool, Weston-under-Lizard, *Shaw*, 113.

S. setaceus L. Common! *Garn.* 343. (3) Kingston Pool! *Fraser*; King's Bromley! *Moore*; Little Aston; Little Bosses; Stonnall, &c. (4) Perton Canal and Reservoir; Oulton.

S. lacustris L. Common, *Garn.*! 343.

S. Tabernæmontani Gmel. (3) Shirleywich, *Garn.* 343; Branston, *J. G. Wells*. (4) Oulton, abundant.

S. maritimus L. (3) Shirleywich, near Stafford, *Stokes, With.* 77; Branston meadows, *Brown*, 291; salt-marsh near Kingston; near Kingston Pool, *Fraser*. No trace of it at Kingston Pool, 1897, *J. E. B.*

S. carinatus Sm. (4) Chickhill Pool, Enville, and at Himley, *Scott, Purt.* iii. "is probably an error, through mistaking *S. sylvaticus* for this."—Wats. Top. Bot. 440.

S. sylvaticus L. (2) Rudyard; Harracles Mill, *Painter*; near Alton; and Churnet Valley. (3) Brook near Pipe Hill, *J. Power*; Stoke Meadows, *Garn.* 343. (4) Weston-under-Lizard, *Shaw*, 113; Lower Penn, *Fraser*; Trysull.

Eriophorum vaginatum L. (1) Wickerstone Rocks, *Painter*. (2) Wetley Moor, *Garn.* 344; near Cheadle! *Carter*, 1839. (3) Whitmore, *Garn.*; near Stafford! *Douglas*; between Shugborough and Brocton! *J. Power*; King's Bromley, *Moore*; Norton Pool and Bog; Sherbrook Valley. (4) Aqualate Mere and Pitmore Pool, *Shaw*, 103; Seckley; Upper Arley.

E. angustifolium Roth. (1) Rickerstone Rocks, between Lask Edge and Rushton Spencer, *Painter*. (2) Wetley Moor, *Garn.* (3) Norton Bog and Common; Chartley Moss; Sherbrook Valley. (4) Aqualate Mere! covering several acres, *With.* 72; Willowbridge, *Garn.*; Penn Common.

Rynchospora alba Vahl. (1) Craddock's Moss. (3) Chartley Moss; Whitmore, *Garn.* 343.

Schœnus nigricans Lange. (3) Norton Bog, *Fraser*. (4) Moreton Moors, *Shaw*, 103.

Cladium jamaicense Crantz. (3) Chartley Moss; Tamworth, *Garn.* 342. (4) Moors near Moreton, *Shaw*, 113.

Carex dioica L. (3) Chartley! *Brown*, 292; Sherbrook Valley. (4) Weston-under-Lizard, *Shaw*. 101.

C. pulicaris L. (3) Chartley! *Garn.* 405; Sherbrook Valley. (4) Aqualate, *Fraser*; Blymhill. *Shaw*, 113; Seckley Wood.

C. disticha Huds. (3) Horninglow, *Brown*, 292. (4) Blym-Hill, *Shaw*, 121; Trescote, *Fraser*; marsh near Oulton.

C. teretiuscula Good. Common? *Garn.* 406. (4) Marsh near Oulton. I have seen this in no other locality, *J. E. B.*

C. paniculata L. Common, *Garn.* (2) Harracles Mill, *Painter*. (3) Trentham Pool, *Garn.*; near Stafford! *Douglas*; canal, Brereton, *Reader*; canal, Milford; Norton Bog; Little Bosses; Stonnall; Sandwell, &c. (4) Lower Penn! *Fraser*; Oulton.

C. vulpina L. Common! *Garn.* 406.

C. muricata L. (2) Churnet Valley. (3) Hawkesyard Park, *Reader*; Rugeley; Streetley; Great Barr; Sandwell, &c. (4) Willowbridge, *Garn.* 406; Lower Penn! *Fraser*.

C. divulsa Good. Very local. (3) Colton; Blithbury; Hamstall-Ridware.

C. echinata Murr. (1) Biddulph, *Painter*. (2) Near Cheadle, *Carter*, 1839. (3) Lichfield, *J. Power*; Cannock Chase; Sherbrook Valley; Chartley; Norton Bog. (4) Blymhill, *Shaw*, 113; Enville, *Fraser*; Trysull.

C. remota L. (1) Swithamley. (2) Anslow; Rolleston, *Brown*, 292; Star Wood, Oakamore; Ramshorn; Alton. (3) Whitmore, common on the limestone! *Garn.* 406; near Knypersley Reservoir, *Painter*; Hawkesyard, *Reader*; Streetley; Stonnall, Codsall, &c.

C. curta Good. (2) Wetley Moor, *Garn.*; near Cheadle, *Carter*, 1839. (3) Big Hill Rough, near Brewood, *Shaw*, 101; between Brindley Ford and New Chapel, *Painter*; Stoke Meadows, *Garn.* 405; Norton Bog; pool near Chase Town; Chartley Moss; Sherbrook Valley. (4) Aqualate Marsh; Pitmoor Pool; Weston-under-Lizard, *Shaw*, 101.

C. ovalis Good. Frequent in all the districts.

C. Hudsonii A. Bennett. (2) Grange Wood, Anslow, *Brown*, 292. (4) Pitmoor Pool, Weston-under-Lizard, *Shaw*, 101; Shelmore Wood, abundant.

C. acuta L. (3) Stoke Meadows, *Garn.* 406; Sandwell; Hamstead; Norton Bog. (4) Seckley Wood! *Fraser*.

C. Goodenowii J. Gay. Common! *Garn.* 406.
b. *juncella* T. M. Fries. (3) Tixall Heath.

C. flacca Schreb. Common! *Garn.* 406.

C. limosa L. (3) Wichbury Hill, *Garn.* 406. (4) Moreton Moor; bogs at Pitmoor, Weston-under-Lizard, *Shaw*, 101. Probably a variety of *C. flacca*, J. E. B.

C. pilulifera L. (2) Near Cheadle, *Carter*, 1839; near Rudyard Reservoir, *Painter*. (3) Needwood Forest, *Brown*, 293. Hawkesyard Park, *Reader*; Norton Bog; Sherbrook Valley; Cannock Chase. (4) Blymhill, *Shaw*, 101; Whitaker; Kinver, *Fraser*.

C. verna Chaix. Common! *Garn.* (2) Wever Hill, *Garn.* 406; Knypersley Pool; Brown Edge, *Painter*; Cannock Chase; Seckley Valley; Norton Bog. (4) Penn Common! *Fraser*.

C. pallescens L. (2) Wetley Moor, *Garn.* 406. (3) Needwood Forest! *Brown*, 294; Crow Lane, Lichfield, *J. Power*; Blithfield Park! Hawkesyard Park, *Reader*. (4) Aqualate; Seckley Wood.

C. panicea L. Common! *Garn.* 406.

C. pendula Huds. (1) Belmont and Madeley Woods, *Garn.*; The Clough, Biddulph, *Painter*. (2) Cheadle, *Carter*, 1839. (3) Brewood, *Garn.*; near Tamworth; near Aldridge; Hamstead. (4) Seckley Wood! *Fraser*.

C. strigosa Huds. Not rare? *Garn.* (2) Near Cheadle, *Carter*; Anslow, *Brown*, 292. (3) Tattenhill, *Brown*. (4) Arley Wood! *Fraser*.

C. sylvatica Huds. (1) Belmont, *Garn.* (2) Cheadle, *Carter*, 1839; Wetton, *Garn.*; Star Wood, Oakamore. (3) Hamstead Wood. (4) Baggeridge Wood! *Fraser*; Seckley Wood.

C. lævigata Sm. Not rare, *Garn.?* 406.

C. binervis Sm. (1) Wood on Congleton Edge, *Painter*. (2) Near Cheadle, *Carter*, 1839; Wetley Moor, *Garn.*; Wever Hill. (3) Cannock Chase; Sherbrook Valley; Norton Bog. (4) Penn Common, Oulton.

C. distans L. (2) Near the summit of Wever Hill, (4) and near Blymhill, *Shaw*, 101; more probably *C. binervis*.

C. fulva Good. (2) Wetley Common, *Garn.* 406. (4) Penn Common, *Fraser*.

C. extensa Good. Moreton Marsh, *Shaw*, 101?

C. flava L. (2) Near Cheadle, *Carter*, 1839; Anslow, &c., *Brown*, 293. (3) Bogs at Whitmore, *Garn.* 406; Knypersley Pool, *Painter*; Sherbrook Valley. (4) Penn Common, *Fraser*; marshy field, Oulton.

C. Œderi Retz. (3) Tixall Heath. (4) Marshy field, Oulton.

C. filiformis L. (1) Madeley, *Garn.* 406.

C. hirta L. (1) Congleton Edge, *Painter*. (3) Common in Stoke Meadows, *Garn.* 406; Cannock Chase; Sherbrook Valley. (4) Shelmore Wood.

C. Pseudo-cyperus L. (3) Whitmore, Ashley, *Garn.* 406; King's Bromley, *Moore*; near Stafford, *Douglas*; Showles Wood, Kingston, near Uttoxeter; pool near Ranton; Little Bosses; Stonnall. (4) Wombourne, *Fraser*; marshy field, Oulton.

C. acutiformis. (2) Harracles Mill; Rudyard, *Painter*; near Cheadle! *Carter*, 1839. (3) Trent near Burton! *Brown*, 294; Tixall Heath; Great Heywood; Kingston Pool; Stonnall, &c.; Sandwell. (4) Marshy field, Oulton.

C. riparia Curtis. (2) Near Cheadle, *Carter*. (3) King's Bromley! *Power*; Colwich; Tixall; Norton Pool; Little Aston, Pendeford, &c. (4) Shelmore Wood.

C. rostrata Stokes. (2) Belmont, *Garn.* 406. (3) Stoke Meadows, *Garn.*; Braunston, *Brown*, 293; between Biddulphs Ford and New Chapel, *Painter*; Stonnall; Little Bosses; Norton Bog. (4) Marshy field, Oulton; canal near Penn.

C. vesicaria L. (2) Belmont, *Garn.* 406; Pool Hall Pool, *Fraser*. (3) Trent near Burton, *Brown*, 293; Stoke, *Garn.*; near Armitage; Rakes End; Croxall. (4) Moreton Moor; Aqualate, *Shaw*, 101; canal near Penn, *Fraser*; Pitmoor, *Garn.*; Dimmings Dale, near Trysull.

GRAMINEÆ.

Setaria viridis Beauv. (3) Weed at Hawkesyard, *Reader*.

Phalaris canariensis L. Frequent, but not wild! *Garn.* 344. (3) Near Burton, *Brown*; near Wolverhampton, *Fraser*; Hamstead Canal, &c.

P. arundinacea L. (1) Rushton Dingle, *Painter*. (2) Alton, Oakamore. (3) Knypersley Pools, *Painter*; Weston-on-Trent! *Garn.* 344; Colton; Sandwell, &c. (4) Lower Penn, *Fraser*; Himley Wood; Seckley Wood, &c.

Anthoxanthum odoratum L. Common.

A. PUELII Lecoq & Lamotte. (3) Hawkesyard, *Reader*. (4) Whittington, *Fraser*!

Alopecurus myosuroides Huds. (3) Marvesyn-Ridware, *Shaw*, 97; abundant about Stone! and Stafford, *Garn.* 344; Hamstead.

A. fulvus Sm. (3) Knypersley Reservoir, *J. W. White*; near the railway-station, Burton, *Brown*, *Garn.* 344.

A. geniculatus L. Common! *Garn.* 344.

A. pratensis L. Common! *Garn.* 344.

b. *pronus* Mitt. (3) Near Armitage, *Reader*.

Milium effusum L. (2) Star Wood, Oakamore. (3) Trentham Woods! *Garn.* 344; Dowles Wood, Kingston; Newton Road; Handsworth Wood. (4) Perton! Yarlet, *Fraser*.

Phleum pratense L. Common! *Garn.* 344.

Agrostis canina L. Common? *Garn.* 344. (3) Hawkesyard, *Reader*; Sherbrook Valley; Handsworth Wood. (4) Blymhill, *Shaw*.

A. palustris Huds. Common! *Garn.* 342.

Var. b. *stolonifera* L. (4) In a close called the Far West Croft at Blymhill, *Dickenson*, *With.* 131.

A. vulgaris With. Common! *Garn.* 344.

A. nigra With. In marly, clayey, or other wet soils, *Dickenson, With.* 131. (2) Churnet Valley. (3) Armitage, *Reader*; near Colton; Milwich, Perry, &c. (4) Upper Arley.

Calamagrostis epigeios Roth. (3) Cotton, near Lichfield, *J. Power*; between Codsall and Codsall Wood! *Fraser*; Collingwood, *Brown*, 294; Kingston Pool. (4) Aqualate, *Shaw*, 99; Blymhill, *Garn.* 344.

C. lanceolata Roth. (3) Kingston Pool. (4) Aqualate Pool, *Shaw*, 99; Pensnett, *Garn.* 344.

Aira caryophyllea L. (3) Ashley; Tittensor! Whitmore; Lichfield, *Garn.* 345; Cannock Chase! *Brown*, 295; Hawkesyard, *Reader*; Pottall. (4) Kinver; Blymhill, *Garn.*; Swindon; Arley.

A. præcox L. (3) Trentham! *Garn.* 345; Hawkesyard, *Reader*; Brocton; Tixall; Ingestre; Pottall. (4) Weston-under-Lizard, *Shaw*, 99; Kinver.

Deschampsia cæspitosa Beauv. Common! *Garn.* 345.

D. flexuosa Trin. Abundant in heathy places! *Garn.*

Holcus mollis L. Common in pastures, &c.! *Garn.*

H. lanatus L. Common in fields and woods! *Garn.*

Trisetum pratense Pers. Common, *Garn.* 347.

Avena pubescens Huds. Common on limestone hills, *Garn.* 347. (2) Wever Hill. (3) Burton, *Brown*, 295; Shenstone; Witton; Great Barr, &c. (4) Upper Arley.

A. pratensis L. (2) Near Calton, on limestone, *Garn.* 346. (3) By the canal, Armitage, *Reader*; Hayhead Lime-works.

A. fatua L. (3) Near Stoke, but it is not common, *Garn.* 346; Hardwick Heath; near Westbromwich.

A. strigosa Schreb. (3) Field, Burton, *Brown*, 295.

Arrhenatherum avenaceum Beauv. In every hedge and cornfield! *Garn.* 345.

b. *nodosum* Reichb. (1) Gallow Heath; Wickerstone Rocks. (3) Norton-in-the-Moors, *Painter*.

Sieglingia decumbens Bernh. (1) Biddulph; Mow Cop; Cat's Edge, *Garn.* 346. (2) Horton, *Painter*. (3) Outwood Hill, Needwood, *Brown*, 295; Hawkesyard, *Reader*; Hardwick; Gailey; Cannock Chase; Stonnall; Streetley, &c.

Phragmites communis Trin. Common in pools! *Garn.* (1) Betley, *Garn.* (2) Sudbury, &c. (3) Kingston Pool; Weston-on-Trent; Shirleywich, &c. (4) Perton Pool! *Fraser*; Norbury Big Moss.

Cynosurus cristatus L. Common! *Garn.*

Koeleria cristata Pers. (2) Limestone rocks, Dovedale; Wetton, *Garn.* 348.

Molinia varia Schrank. (1) Near Mow Cop; Wickerstone Rocks, *Painter*. (2) Near Oakamore. (3) Lask Edge, *Painter*; Whitmore; Maer, *N. S. S. Rep.* 91; Hawkesyard, *Reader*; Cannock Chase! *Brown*, 296; Chartley Moss; Kingston; Bagot's Wood; Gailey, Tixall; Sherbrook; Norton Bog, &c.

Catabrosa aquatica Beauv. (3) Needwood Forest, *Brown*, 297; Ranton; Stafford; Colwich; Ingestre; Tixall; Shenstone; Perry, &c.

Melica nutans L. (2) Abundant on broken limestone in the valleys of the Hamps and Manyfold, *Garn.* 345.

M. uniflora Retz. Frequent in shady woods, as at Trentham! *Garn.*; throughout the county.

Dactylis glomerata L. Common! *Garn.* 346.

Briza media L. In meadows and pastures! *Garn.* 346. (2) Froghall. (3) Near Knypersley Hall, *Painter*; Hamstead; Pipe Marsh, &c. (4) Norbury Park; Arley Wood, &c.

Poa annua L. Common! *Garn.* 345.

P. nemoralis L. (2) Belmont, *Shaw*, 101; Rolleston Grange Wood, *Brown*, 296. (3) Brewood, *Shaw*, 110; Hawkesyard, *Reader*; Hamstead; Handsworth Wood.

P. compressa L. (3) Abbey-walls, *Brown*, 296; footways near Blithfield.

P. pratensis L. Common, *Garn.* 345.

b. *subcærulea* Sm. (3) Weston-on-Trent; Ranton; Ingestre; Norton.

P. trivialis L. Common! *Garn.* 345.

Glyceria fluitans R. Br. Common! *Garn.* 345.

G. plicata Fr. (2) Rudyard Reservoir, *J. W. White*. (3) Near Stafford, *Douglas*; between Armitage and Lyndon, *Reader*; large pool, Sandwell.

b. *pedicellata* (Townsend). (2) North end of Rudyard Reservoir, *Painter*; Dovedale. (3) Colwich, Blackbrook, Shenstone; Newton Road. (4) Upper Arley.

G. aquatica Sm. Common in wet places! Trent side! &c., *Garn.* 345. (3) Gailey; Ranton; Stoke; Armitage; Shenstone; Great Barr; Alrewas, &c. (4) Blymhill, *Shaw*, 99; Perton Reservoir; Trysull, &c.

Festuca rigida Kunth. (2) Tutbury Castle walls, &c. (3) Oak plantations, Shobnall, *Brown*, 296; Marvesyn-Ridware, *Reader*.

F. Myuros L. Common? *Garn.* (3) Norton Common. (4) Blymhill to Burlington Brook, *Shaw*, 104.

F. sciuroides Roth. Common! *Garn.* 346.

F. ovina L. Common on limestone, *Garn.* 346. (1) Swithamley Hill. (2) Wever Hill. (3) Hardwick; Cannock Chase; Norton Bog; Barr Beacon. (4) Oulton; Norbury.

b. *capillata* Hockel. (3) Norton Bog, Barr Beacon.

F. rubra L. (1) Biddulph, *Painter*. (3) Barr Beacon; Perry Barr, &c. (4) Restlaw Meadows, Blymhill, *Dickenson*, *With*. 154; walls of Dudley Castle, *With*. 154.

F. sylvatica Vill. Blymhill, *Shaw*, 103; occasional in woods, *Garn.*; most probably an error.

F. elatior L. (3) Burton, *Brown*; bushy places by the Trent at Stoke, *Garn*. 346. (4) Seckley Wood.

c. *pratensis* Huds. Common in the county.

F. ELATIOR × LOLIUM PERENNE. (3) Meadows, Trent, Armitage, *Reader*; fields near Newton; Perry Barr.

Bromus giganteus L. Frequent. (2) Tutbury! *Fraser*; Alton Towers, &c. (3) Stoke, *Garn*. 346; Lion's Paw Wood, *Painter*; Armitage, *Reader*; Sandon, Milwich, &c. (4) Upper Arley, &c.

B. ramosus Huds. Frequent throughout county.

B. sterilis L. Common throughout county.

B. SECALINUS L. (3) In cornfields, Penkhull, *Garn*. 436; Burton, *Brown*, 297. I have not seen this in the county.

B. racemosus L. Common? *Brown*, 298. (2) Dovedale. (3) Hamstall-Ridware, *Shaw*, ii. 7; Pipe-Ridware; Stonnall.

B. commutatus Schreb. Common? *Brown*, 298. (3) Near Stafford! *Douglas*; fields, Sandwell; Streetley. (4) Shelmore Wood; Oulton.

B. mollis L. Very common! *Garn*. 346.

Brachypodium gracile Beauv. Common in all districts.

B. pinnatum Beauv. Hamstall-Ridware? *Shaw*, ii. 7. I think this is a misnomer.

Lolium perenne L. Common.

e. *italicum* Braun. (3) Knypersley, *Painter*; Newton; Oscott; Queslet.

L. temulentum b. *arvense* With. Hamstall-Ridware. *Shaw*, ii. 7.

Agropyron caninum Beauv. Common? *Garn*. 347. (3) Canal embankment by Armitage Church, *Reader*; Sandwell; Canwell; Tixall; Chartley, Kingston Pool, &c. (4) Himley.

A. repens Beauv. Common.

Nardus stricta L. (1) Biddulph, *Painter*. (2) Wetley, *Garn*. 244; Cannock Chase! *Moore*; Needwood Forest! *Brown*, 295; Chartley Park! *Garn.*; Hawkesyard; Beaudesert! *Reader*; Hardwick; Gailey; Norton Bog; Pipe Marsh; Sherbrook Valley; Hints, &c. (4) Norbury Big Moss; Oulton.

Hordeum secalinum Schreb. (2) Uttoxeter! *Garn*. 347. (3) Stone; Stafford, *Garn.*; King's Bromley, *Moore*.

H. murinum L. Waste places, but rare in the north, *Garn*. 347. (2) Tutbury Castle. (3) Branston, *Brown*, 208; Lichfield Close! *Garn.*; Great Bridgeford; Hints; Alrewas; Great Barr; Cannock, &c. (4) Stewponey; Gornal Wood.

FILICES.

Hymenophyllum unilaterale Bory. (1) Clefts of rocks, Gradbatch, near Flash, *Dr. Hewgill Garn.* 419.

Pteris aquilina L. Very common.

Lomaria Spicant Desv. (1) Biddulph, *Painter*. (3) Milford Hall, *Pickard*; Sherbrook Valley. (4) White Sitch Pool, on the dam, *Shaw*, 110; Seckley Coppice.

Asplenium Adiantum-nigrum L. Frequent? (1) Hugley Castle, &c., *Garn.* 419. (2) Rocks, Dovedale! *Brown*, 300.

A. viride Huds. Dovedale, *Garn.* 419.

A. Trichomanes L. (1) Heyley Castle, *Garn.* (2) Wever Hill moorlands, *Shaw*, 99; Dovedale, *Garn.* 419; Manyfold Valley, *Fraser*; Longnor; Glutton Dale, *N. S. S. Rep.* 91. (3) Walls of Lichfield Cathedral! *Garn.*; walls, Hawkesyard, *Reader*; bridge near Gailey Reservoir.

A. Ruta-muraria L. (2) Wever Hill moorlands, *Shaw*, 99; Tutbury Castle, *Brown*, 300. (3) Lichfield Cathedral! *Garn.* 419; Burton Bridge, *Brown*, 300; walls, Hawkesyard, *Reader*; bridge, Gailey Reservoir. (4) Bridge near Prestwood House; walls, Arley; walls, Shatterford.

Athyrium Filix-fœmina Roth. (2) Star Wood, Oakamore! *Carter*, 1839. (3) Blithfield; Bagots Wood; Showles Wood, near Kingston. (4) Blymhill; Pitmoor; Weston-under-Lizard, *Shaw*, 111; Norbury; Shelmore Wood.

Var. *erectum* Syme. (2) Star Wood, Oakamore. (3) Showles Wood, Kingston; Bagots Wood; Tixall; Kingston Pool. (4) Blakemore Pool; Seckley Wood.

Ceterach officinarum Willd. (2) Wetton; Beresford; Beeston Tor; Dovedale, *Garn.* 418; Hamps Valley, *Fraser*. (4) Near Prestwood House, Enville.

Scolopendrium vulgare Symons. Common in damp places? *Garn.* 419. (3) Stapenhall, near Burton, *Shaw*, 99; Weston and Rugeley, *Pickard*.

Cystopteris fragilis Bernh. (2) On a wall between Oakamore and Cotton Hall, *Shaw*, 111; near Cheadle, *Carter*, 1839; Ecton Hill, *Fraser*; Longnor, *N. S. S. Rep.* 92; Rudyard Reservoir, *Painter*. (3) On Butterton Park Walls, *Garn.* 419; Knypersley Park, *Painter*.

Polystichum lobatum Presl. Common! with the var. *lonchitioides*, Garn. 418. (2) Near Cheadle, *Carter*, 1839.

b. *aculeatum* Syme. (2) Near Cheadle! *Carter*, 1839; Hamps Valley, *Fraser*. (3) Russells Hall and Rowley, *Shaw*, ii. 7; common in dingles near Burton, *Brown*, 300; Hall Lane, near Walsall. (4) Seckley Wood.

P. angulare Presl. On the limestone, *Garn.* 418. (2) Star Wood, Oakamore. (3) Near Stafford, *Douglas*. (4) Arley Wood; Seckley Wood.

Lastræa Thelypteris Presl. (3) Chartley! and Cannock, *Brown*, 299; Chartley, *N. S. S. Rep.* 86. (4) Offley Hay, *Garn.* 418.

L. Oreopteris Presl. (1) Biddulph, *Painter*. (2) Near Cheadle! *Carter*, 1839; Frog Hall, *Garn.* 418. (3) Byrkley Park, Needwood; Farley, &c., *Brown*, 299. (4) Offley Hay, *Garn.*; Seckley Wood; Coldridge Wood.

L. Filix-mas Presl. Common! *Garn.* 418.

b. *affinis* Bab. (3) Woods, Tixall; Showles Wood, Kingston. (4) Blakemore Pool.

c. *paleacea* Moore. (2) Marchington Forest Banks. (3) Wood near Tixall; Showles Wood, near Kingston. (4) Near Blakemore Pool.

L. cristata Presl. (3) Kingston Pool, *Fraser*; Chartley Moss, *N. S. S. Rep.* 86. I have not seen it in either locality; but both are now drained, or nearly so.

L. spinulosa Presl. Common, *Garn.* 418. (2) Near Cheadle! *Carter*, 1839; Marchington Forest Banks. (3) Byrkley Park and elsewhere in Needwood, *Brown*, 299; Curborough Lane, *J. Power*; Chartley Moss! *N. S. S. Rep.* 86; Bagots Wood; Showles Wood, Kingston. (4) Bishop's Wood, *N. S. S. Rep.* 91.

L. ULIGINOSA Newman. (3) Chartley Moss? *N. S. S. Rep.* 86.

L. dilatata Presl. (2) Near Cheadle, *Carter*, 1839; Alton, *Dr. Parsons*! (3) Hawkesyard Park, *Reader*; Bagots Wood; Showles Wood, Kingston; near Wood Eaves; Little Aston. (4) Seckley Wood, &c.

Polypodium vulgare L. Common! *Garn.* 418.

Phegopteris Dryopteris Fée. (1) Quarnford, *Garn.* 418. (2) Roadside between Oakamore and Coton Hall, *Shaw*, 110; near Cheadle; Wever Hill, *Carter*, 1839; Forest Banks, *Brown*, 299; Alton, *Garn.* (3) Needwood Forest, *Bagot*, *With.* 113; Knypersley Park, *Painter*; Trentham; Burford, *Garn.*; Yoxall Lodge Grounds, *Brown*, 299. (4) Woods at Gospel End, *Wainwright*, *Shaw*, ii. 6.

P. calcarea Fée. (2) Alton, *Carter*, 1839.

Osmunda regalis L. (1) Balterley, *Garn.* 419. (3) Marsh near Lichfield Racecourse, *J. Power*; Chartley Moss, *Mr. Bagot*, *With.* 991. (4) Willowbridge, *Garn.*; Aqualate Mere, *Shaw*, 110; Moreton Moors, three miles from Blymhill, *Dickenson*, *With.* 991.

Ophioglossum vulgatum L. (2) Near Cheadle, *Carter*, 1839. (3) Shobnall, *Brown*, 301; Hawkesyard, *Reader*; Stafford, *Douglas*; Knypersley, *Painter*; Castle Hill, *Pickard*; near Hayhead. (4) Blymhill, *Dickenson*, *With.* 989; Sedgeley, *Fraser*.

Botrychium Lunaria Sw. (1) Axe Edge; Mow Cop, *Garn.* 419. (2) Wootton; Cheadle Common, Dilhorn, *Carter*, 1839; woods at Belmont, *Shaw*, 110; Whiston, *Garn.* (3) Maer, *Pinder*; Hawkesyard, *Reader*. (4) Enville, *Fraser*; Kinver.

EQUISETACEÆ.

Equisetum maximum Lam. Common? *Garn.* (3) Knypersley Park, *Painter*; banks of canal near Wood Eaves; Tixall; Tixall Heath. (4) Penn, near the church.

E. arvense L. Common! *Garn.* 420.

E. sylvaticum L. (2) Cotton Hall, *Shaw*, 103; near Leek! *Fraser*; Star Wood, Oakamore. (3) Beaudesert, *Reader*; Trickley Coppice, near Chartley, *Pickard*.

E. palustre L. Common! *Garn.* 420.

c. *nudum* Newm. (3) Hopton Pools; Norton Bog; near Hints.

E. limosum Sm. Common, *Garn.* 420.

b. *fluviatile* (L.). (2) Near Harracles Mill, *Painter*. (3) Knypersley Pool, *Painter*; Hopton Pool; Wood Eaves; Canwell Hall, Hayhead.

E. hyemale L. (2) Rolleston Hall, *Brown*, 299. (3) On Prestwood Farm, Wednesfield, *Pitt*, *Shaw*, 103; Lichfield, *Garn.* 420.

LYCOPODIACEÆ.

Lycopodium Selago L. (3) Needwood Forest, *With.* 742. (4) Maer Heath, *Garn.* 420; Offley Hay, *Garn.*

L. inundatum L. (2) Dimmings Dale, near Cheadle, *Carter*, 1839. (3) Norton Bog; Cannock Wood, *Bagot*, *With.* 742. (4) Offley Hay, *Garn.*

L. clavatum L. (1) Mow Cop, *Garn.* 420. (2) Whiston, *Garn.*; Cheadle, *Carter*, 1839. (3) Cannock Heath! *With.* 750; Sherbrook Valley; Barr. (4) Swindon Heath, *Shaw*, ii. 6.; Enville, *Fraser*.

MARSILIACEÆ.

Pilularia globulifera L. (3) Hatherton. (4) Offley, *Garn.* 420.

CHARACEÆ.

Chara fragilis Desv. (3) Knypersley Pools, *Miss Thompson*; near Gnosall. (4) Near Oulton.

d. *Hedwigii* Kuetz. (3) Canal, Wall Lane; pool, Red House, Great Barr.

C. hispida L. (1) Betley, *Garn.* 434. (3) At the bottom of a spring in a meadow at Gayton, *Stokes*, *With.* 3. (4) Forton Moss; Aqualate, *Shaw*, 101.

C. vulgaris L. (2) Near Mayfield. (3) Pool near Little Hay. (4) Gravel-pit at Blymhill, *Shaw*, 101; Spittle Brook Mill, abundant.

C. tomentosa L. (3) Needwood, *Shaw*, ii. 7.

Nitella translucens Agardh. (3) Deep pools at Hatherton, *Garn.* 434; pit at Tipton.

N. flexilis Agardh. (3) Near Fradley Marl-pits, *J. Power*; near Milwich and Fradwell, abundant. (4) Blymhill, *Shaw*, 101.

N. opaca Agardh. (3) Fradley, *H. & J. Groves*; pool in Sherbrook Valley, abundant.

SUMMARY.

Mr. Hewett C. Watson in his *Compendium of the Cybele Britannica* has for convenience grouped our British plants into certain leading "Types of Distribution." These groups are primarily six, to which two others are subordinate; they may be briefly stated thus:—

1. British Type. Species widely spread throughout South, Middle, and North Britain.
2. English Type. Species chiefly seen in South or South-Middle Britain.
3. Scottish Type. Species chiefly seen in North and North-Middle Britain.

Intermediate Type. Species chiefly seen in Middle Britain.

4. Highland Type. Species chiefly seen about mountains.
5. Germanic Type. Species chiefly seen in East England.
6. Atlantic Type. Species chiefly seen in West England.

Local species restricted to single or few provinces.

The following is an analysis of the Staffordshire Flora, based on the above, with a full analysis of the British Flora for comparison:—

Types.	Staffordshire.	Great Britain.
British	514	532
English	274	409
Scottish	33	81
Intermediate	15	37
Highland	4	120
Germanic	28	127
Atlantic	11	70
Local	3	49
	882	1425

An analysis of the Flora according to Watson's divisions of British plants into various degrees of citizenship, would result as follows:—

Native	865
Denizen	35
Colonist	27
Alien	70
Casuals	9
Ambiguities	8
Varieties	150
	1164

BOTANICAL INVESTIGATION IN STAFFORDSHIRE.

Of the older botanists, JOHN RAY (1623–1704-5) appears to have been the first to publish any records of Staffordshire botany; but although this distinguished naturalist lived for some six years at Middleton Hall, on the confines of Staffordshire, he seems to have paid but little attention to its flora. He noted *Campanula latifolia* "in the mountainous parts of Staffordshire," and *Empetrum nigrum* "in montibus udus Staffordientibus," and records *Diplotaxis tenuifolia* from Lichfield Close, and *Thlaspi arvense* from "many places at Stone."

William Withering (1741–1799) was born at Wellington in Shropshire, where his father practised as apothecary and surgeon. He received his early education from the Rev. Henry Wood, of Ercall; afterwards he studied at Edinburgh, where he took his degree of M.D. in 1766. He first practised as physician to the infirmary at Stafford, and from the country around seems to have obtained much of his botanical knowledge. In 1786 Dr. Withering went to live at Edgbaston Hall, near Birmingham, and from the grounds and the neighbouring woodlands obtained much interesting matter for his *Systematic Arrangement of British Plants*, a classical work on the British Flora, and an advance on all works on descriptive botany that had yet been published. That it was appreciated is seen by the fact that three editions were published within twenty years—the first in two volumes in 1776, the second in three volumes in 1787, and the third in four volumes in 1796; these were published during his lifetime. Withering died at The Larches in 1799, and was buried in the old church at Edgbaston. He records in his third edition thirty-two plants new to Staffordshire; the more rare are—*Lathyrus Nissolia, Pyrus torminalis, Hippuris,** *Galium Witheringii, Schollera, Andromeda, Hypopitys, Atropa, Scirpus maritimus, Agrostis nigra, Ophioglossum, Osmunda, Lycopodium Selago, L. inundatum.*

Jonathan Stokes (1755–1831) was born at Chesterfield, and studied and took his degree as Doctor of Medicine at Edinburgh University. Stokes appears to have been on terms of close friendship with Withering, and it seems probable that he lived for a time in Birmingham. It is evident that he had free access to Withering's extensive botanical library for the purpose of obtaining the new and valuable set of references mentioned in the preface to the second edition of the *Systematic Arrangement*, which preface was given in the subsequent editions. A schedule is still in existence showing that Withering lent Stokes one hundred and forty-five botanical works, ranging from the earliest botanical writers to those of the then most recent times. These Stokes took with him first to Shrewsbury, and afterwards to Kidderminster, and retained them for more than three years. It seems to have been due to Stokes's refusing to return them that he and Withering ceased to be on friendly terms; ultimately by resorting to legal aid Withering regained his botanical library. In the third and following editions, Stokes's name was omitted from the title-page, but his references were retained. Stokes seems to have done little botanical work in Staffordshire, nearly all his rarer records being from near Stafford or near Birmingham; some seem to have been found in company with Withering, the abbreviated names of both—"St.," "With."—

---

* When only one species of a genus is known to be British, the generic name only is given.

following the record. In 1812 Stokes published *A Botanical Materia Medica* in four volumes, which, like the second edition of Withering, is useful on account of the extensive synonymy and the copious references to the figures given by the earlier writers. In 1790 Stokes was elected an associate of the Linnean Society. Some years later he returned to Chesterfield, where he died in 1831, aged seventy-six. The following are his more important Staffordshire records:—*Ranunculus Lingua*, *Viola lutea*, *Buda marina*, *Rhamnus Frangula*, *Cicuta virosa*, *Pimpinella major*, *Campanula Rapunculus*.

Hon. WILLIAM BAGOT (1773–1856) recorded several plants in the third edition of Withering, his notes being mainly from Blithfield, where he lived, and the surrounding district. In October, 1798, he succeeded his father as second Baron of Bagots Bromley in the county of Stafford. He was a Fellow of the Linnean Society and of the Society of Antiquarians, and was well versed in natural history studies. He died in 1856, aged eighty-three. He recorded *Pyrola rotundifolia*, *Utricularia minor*, &c.; but his most interesting record is that of *Centunculus minimus* from Blithfield, its only known locality in Staffordshire.

STEBBING SHAW in his great work on *The Antiquities of Staffordshire* (1798–1801) published long lists of plants compiled by the Rev. S. DICKENSON and other Staffordshire botanists. Very many of these are first records, the more interesting being *Trollius*, *Helleborus fœtidus*, *Dianthus Armeria*, *Hypericum Elodes*, *Lathyrus sylvestris*, *Cotyledon*, *Drosera intermedia*, *Crepis paludosa*, *Fritillaria*, *Brachypodium pinnatum*, *Hymenophyllum unilaterale*, &c. To the Rev. Samuel Dickenson (1730–1823) the greater portion of the record is due, his investigations having been made in the rich woods, bogs, and moorlands in the country around Blymhill, of which parish he was rector for many years. He died in 1823, and was buried in Blymhill churchyard. Rev. THOMAS GISBORNE, B.A., F.L.S. (1758–1846), eldest son of John Gisborne, of Yoxall Lodge, took high honours at Cambridge in 1780, was Sixth Wrangler and first Chancellor's Medalist, and wrote a number of works on philosophy. Paid special attention to the Wever Hill district, and was so enamoured of it as to have a written a poem *The Vales of Wever*, in which some of its special plants are mentioned. JOHN SNEYD (fl. 1797), of Belmont Hall, recorded many plants from the Hamps and Manifold to Shaw, such as *Ribes alpinum*, *Convallaria majalis*, &c. RICHARD FORSTER (fl. 1797), surgeon and naturalist at Stone, "helped," says Shaw, "and greatly facilitated my botanical and other researches in the neighbourhood of Stone." He records *Habenaria bifolia*, *Alisma ranunculoides*, &c. EDWARD BOURNE, M.D. (fl. 1797), of Cheadle, recorded several plants to Shaw; afterwards removed to Atherstone in Warwickshire, 1801, and botanized the neighbouring Staffordshire district, from which he records *Myosurus minimus*. Rev. R. WOLSELEY (1772–1815) recorded plants from Wolseley and district; *Gentiana campestris*, *Glaux*, &c; Shaw spells his name incorrectly "Wolsey." R. WAINWRIGHT (fl. 1797) contributed to Shaw a long list of records, including *Blackstonia*. He was a surgeon of Dudley, and an enthusiastic botanist. Mr. RILEY (fl. 1797), of Hamstall-Ridware, also sent a list of plants to vol. ii. of Shaw's *Staffordshire*. W. PITT (1749–1823), author of *Agricultural Survey of Staffordshire*, 1794, *Topographical History of Staffordshire*, 1817, sent notes to Withering's third edition, and to Shaw. He lived at Pendeford, Staffordshire, but afterwards removed to Edgbaston; died 1823, and was buried at Tettenhall.

JOHN POWER (flourished 1778–1831). My only knowledge of this botanist is that obtained from his many notes in a copy I have of the *Botanist's Guide*, 1805, which formerly belonged to him. From one of these I learn that he had resided at Market Bosworth, Leicestershire, and later at Polesworth, Warwickshire, and lastly at Atherstone in that county, and also that he had attentively studied the flowering plants of Warwickshire, Staffordshire, Leicestershire, and incidently those of Derbyshire; and had also paid attention to the lichens of these counties and those of Derbyshire. He seems to have been the author of the *Calendar Flora of Market Bosworth*. His herbarium, which bears dates from 1778 to 1833, was presented years ago to the Holmesdale Natural History Club, Reigate, many specimens of which I have, by the courtesy of Mr. C. E. Salmon, seen; and find the writing and records identical with the records in my copy of the *New Botanist's Guide*. His records are numerous, the more rare being *Teesdalia*, *Stellaria palustris*, *Potentilla argentea*, *Doronicum Pardalianches*, *Limosella*, *Utricularia vulgaris*, *Acorus*, *Nitella flexilis*.

Rev. WILLIAM THOMAS BREE (1787–1863), Rector of Allesley, was born at Coleshill, Warwickshire, in 1787. Made occasional visits to Dovedale and other Staffordshire localities, his records being given in Purton's *Midland Flora:* these include *Silene nutans*, *Prunus Padus*, *Pyrus Aria*, *Inula Helenium*, *Antirrhinum Orontium*, *Spiranthes autumnalis*, *Crocus nudiflorus*, *Polystichum lobatum*. He died at Allesley Rectory, 1863.

THOMAS PURTON (1768–1833) was born at Endon Burnell, Shropshire, and in 1818–20 published his valuable *Midland Flora*. Although he gave his more especial attention to Warwickshire, seems to have made occasional visits to that portion of Staffordshire nearest his native home, as Himley and Enville, whence he records five Staffordshire plants:—*Ornithopus*, *Campanula patula*, *Pyrola media*, *Orchis ustulata*, and *Scirpus carinatus*, the last being probably an error.

JAMES CARTER in 1839 published in the *Magazine of Natural History* (N. S. vol. iii. 72) a paper on the plants growing near Cheadle. This contains twenty-three additional Staffordshire plants, many of which I have seen in that locality quite recently, the more rare being *Geranium pusillum*, *Saxifraga hypnoides*, *Pyrola minor*, *Orobanche elatior*, *Carex strigosa*, *Phegopteris calcarea*. I am unable to find any records of this botanist.

ROBERT GARNER, M.D. (1808–1890), was born at Longton, Staffordshire, 1808, and from his youth upwards evinced a great love for natural history pursuits; this led to his choice of the medical profession. His early medical training was received in the pottery district, partly at the North Staffordshire Infirmary, under Mr. Spark, who was also a botanist; afterwards he became a student under Sir Charles Bell, at the New London University. On attaining his medical degree Garner commenced practice in London, but a few years later removed to Stoke, where he passed most of his life. He was a man of varied talents, genial and unassuming, and had a large circle of friends; was an industrious writer, and a devoted student of natural history, and many pamphlets were published by him bearing on that study. His great work is *The Natural History of the County of Stafford*, printed in 1844, and in this he gives evidence of a very wide knowledge of natural science, botany, geology, mineralogy, and the allied science archæology. He was the founder of the North Staffordshire Natural History Field Club and Archæological Society, of which he was more than once president, and to whose meetings he contributed many papers on a very varied range of subjects, and this society sustained a great loss in his death in 1890. His excellent work contains an almost complete Flora of Staffordshire, over four hundred and seventy plants being for the first time recorded for that county, the more interesting being *Clematis*, *Ranunculus sardous*, *Helleborus viridis*, *Silene anglica*, *Hutchinsia*, *Silene noctiflora*, *Cerastium arvense*, *Arenaria verna*, *Sagina subulata*, *Lotus tenuis*, *Smyrnium*, *Silaus flavescens*, *Galium erectum*, *G. sylvestre*, *Onopordon*, *Picris*, *Solanum nigrum*, *Hydrocharis*, *Alopecurus fulvus*, *Melica nutans*, *Lastræa Thelypteris*, *Pilularia*, *Nitella translucens*.

Edwin Brown (fl. 1818–1876) published in Mosley's *Natural History of Tutbury* a Flora of the District around Tutbury and Burton. He was, I believe, manager of the Union Bank at Burton-on-Trent, and a careful and enthusiastic botanist. His list includes records from the neighbouring counties of Leicester and Derby; of his Staffordshire records twenty-one are additions. The less common are *Ranunculus Lenormandi*, *Coronopus didyma*, *Trifolium filiforme*, *Chenopodium polyspermum*, *Scirpus pauciflorus*, and *Poa compressa*.

Rev. Robert C. Douglas sent to the late Hewett C. Watson in 1851 a list of plants seen within three miles of Stafford; these are mostly recorded in *Topographical Botany*, and among these are seven plants not previously recorded:—*Ranunculus circinatus*, *R. fluitans*, *Calamintha Clinopodium*, *Lamium Galeobdolon*, *Potamogeton prælongus*, *Glyceria plicata*, *Bromus commutatus*.

John Fraser, M.D., of Wolverhampton, has for many years made a special study of the Staffordshire Flora, and made a valuable collection of the rarer plants of the county; the notes given are records of some of the more special plants in his herbarium; of these many are first records, the more especial being *Ranunculus Bachii*, *Sagina ciliata*, *Lathyrus Aphaca*, *Pyrus rupicola*, *Hieracium maculatum*, *Salix Woolgariana*, *S. purpurea*, *S. Forbyana*, *S. Smithiana*, *Stratiotes*, *Neottia Nidus-avis*, *Lastræa cristata*, *Phegopteris polypodioides*.

At various times the Rev. William Hunt Painter has done most useful work; he has published in the reports of the North Staffordshire Natural History Society papers on the botany of Biddulph and other Staffordshire localities, in which the following are new records:—*Rubus leucostachys*, *R. hirtifolius*, *R. pyramidalis*, *R. criniger*, *Rosa sphærica*, *Cuscuta Trifolii*, *Salix sericans*, *Chara fragilis*. Other valuable work has been done by the Rev. W. H. PURCHAS, who would fittingly have undertaken the present Flora; the Rev. H. P. READER; by many of the members of the North Staffordshire Natural History Society, which will be found recorded in due sequence. My own time has been more especially given to the *Rubi* and *Rosæ* of the county; but much has still to be done among these plants.

ERRATA.

Page 1, line 33 from top, for "East" read "West."
,, 5, ,, 4 ,, ,, "Lodges" read "Lodge."
,, 6, ,, 3 ,, ,, "Kingstone" read "Kingston."
,, 6, ,, 36 ,, ,, "Shippenhall" read "Slappenhill."
,, 6, ,, 39 ,, omit "Foremark."
,, 7, ,, 29 ,, for "397" read "392."
,, 8, ,, 16 ,, ,, "Welton" read "Wetton"
,, 8, ,, 19 ,, ,, "Wetton" read "Weston."
,, 12, ,, 12 ,, omit "Breedon."
,, 28, ,, 13 ,, for "*alternifolium*" read "*alterniflorum*."
,, 30, last line ,, ,, "Onecoat" read "Onecote."
,, 43, line 19 ,, "(3)" should follow Croxden Abbey.
,, 48, under line 22, insert "BALLOTA NIGRA L. Common in dry places! *Garn.* 384."

I. A. R. I. 75.

IMPERIAL AGRICULTURAL RESEARCH
INSTITUTE LIBRARY
NEW DELHI.

Date of issue.	Date of issue.	Date of issue.
4-9-59		